

CHAPTER 1 INTRODUCTION



Chapter 1: Introduction

National Park Service policy requires that each park with vegetation capable of burning prepare a plan to guide a fire management program responsive to natural and cultural resource objectives, protection of developed facilities, and safety considerations for park visitors and staff. The plan must describe a full range of strategic and tactical operations that would be used to ensure that all fire-related management actions and wildland fires are effectively managed.

Whiskeytown National Recreation Area is currently operating under a Fire Management Plan that was written in 1985 and revised in 1993. The existing plan addresses various fire management techniques, including fire suppression, prescribed fire, and the limited use of mechanical treatment to reduce forest fuels. The National Park Service proposes to revise Whiskeytown's Fire Management Plan to meet changing fire management goals at Whiskeytown. The fire management plan outlines a program designed to contribute to the achievement of fire management goals to protect natural and cultural resources and developed facilities, as well as the safety of park staff and visitors.

Whiskeytown National Recreation Area is located in the Klamath Mountains – where the cool, wet, winters and warm, dry summers, predisposes much of the area to conditions that would carry fire on a yearly basis. The lack of information specific to Whiskeytown makes the classification of the park's fire regimes into one or two clearly defined categories difficult. Inferences must be made from research conducted in similar plant communities and pieced together across the landscape. The definition of the role of fire is complicated even more by the fact that the park lies within a transition zone (between the Sacramento Valley and the Klamath Mountains) that has extreme ranges in elevation. What is clear is that the dynamic integration and patterns of Whiskeytown's plant communities is a reflection of numerous fire regimes along topographic and geographic gradients. It is these fire regimes that have helped to define the pattern of age classes, succession stages, and plant communities that are described in this document.

Although data on specific species composition and structure is lacking, the late 1800's General Land Office surveys describe the distribution of Whiskeytown's plant communities in a manner very similar to what is found in the park now. Much of the lower elevation blue oak grasslands, mixed oak woodlands, chaparral, knobcone, and ponderosa pine communities have experienced fire at least once within the last seventy years. However, little is known of the role of fire in landscapes where these habitat types intergrade with one another in such a way that distinct boundaries between them are difficult to determine. Black oak and ponderosa pine forests burned frequently with fires generally of low to moderate severity and historical fire regimes from two to twenty- three years. Mixed in with these communities are the chaparral and knobcone pine plant communities, which usually support severe stand- replacement fires. Higher up in elevation, frequent fires of low to moderate severity characterize where the mixed conifer plant community blends into where ponderosa pine and mixed oak woodlands dominate. This fire regime can vary considerably in both frequency and severity, depending on site- specifics, every seven to fifteen years. From a landscape perspective, it appears that many of these high- elevation forests areas were generally more open than they are today, due mostly to the frequency of fires. This may have promoted more grasses and herbs than are associated with most forest stands today.

The combination of logging and fire suppression has profoundly affected the structure and composition of these middle to high elevation forests. Many of the park's ponderosa pine and mixed conifer stands have become denser, mainly in small and medium size classes of shade- tolerant and fire- sensitive species. Stands have also become less complex and more homogeneous in terms of spatial arrangement. In many areas, ecosystem diversity and sustainability appear to be jeopardized by these changes, even without the threat of severe fires.

Wildland fire management activities in National Park sites are essential to the protection of human life, personal property and irreplaceable natural and cultural resources. Safety risks and expenses associated with fire management activities require exceptional skill and attention to detail when planning and implementing fire management activities. Safety is critical when considering the park's seven in- holders, numerous National Park structures, and the fact that the majority of the park's visitation takes place in these plant communities and associated fire regimes. It is because of this, and the proximity to communities like French Gulch, Old Shasta, Centerville, Igo, and Redding, that the National Park Service has identified Whiskeytown National Recreation Area as being at high risk for high severity wildland fire.

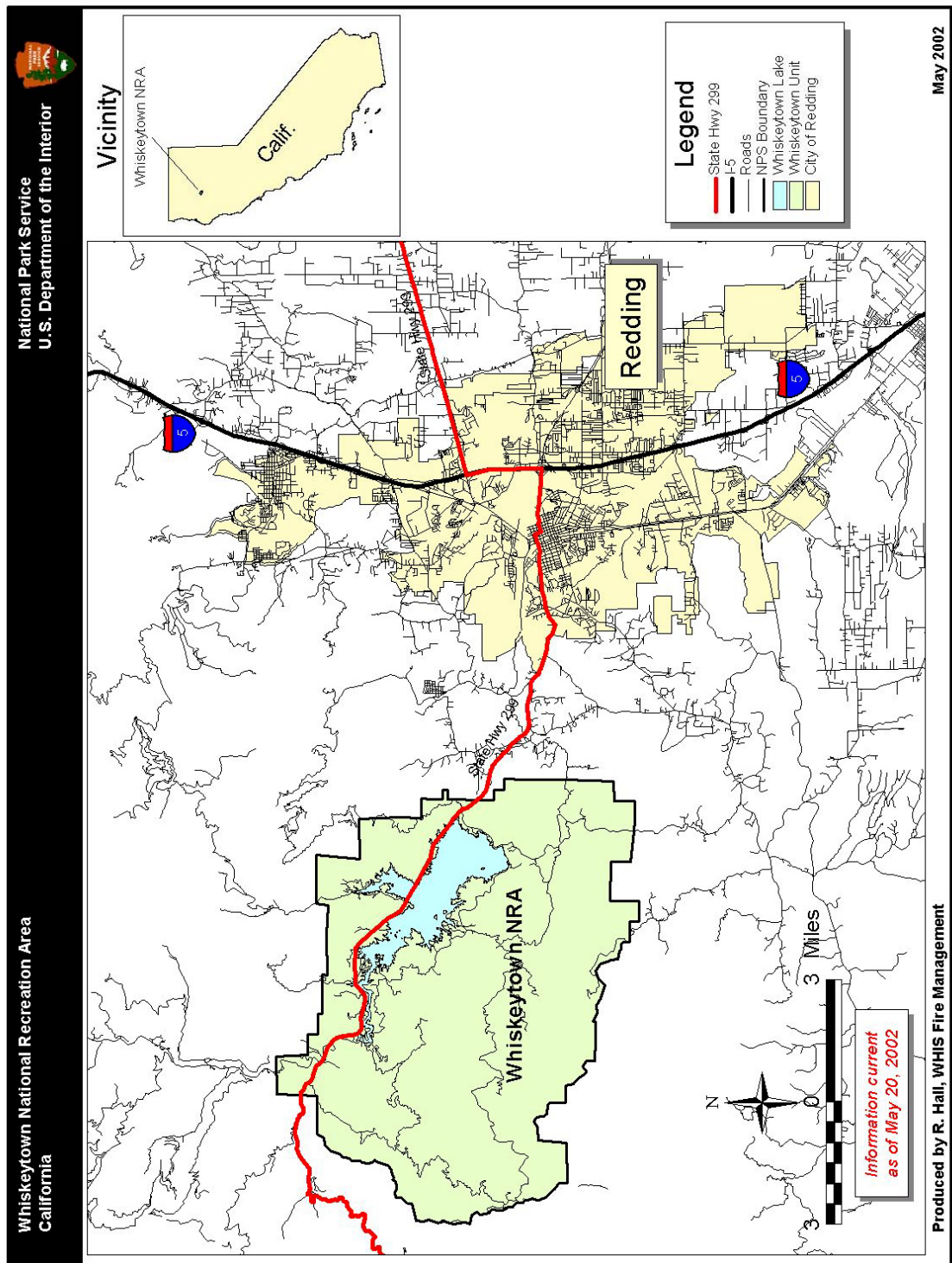
However, the means by which we need to provide for safety while restoring and sustaining these ecosystems are controversial. Letting nature take its course may be appropriate in some areas that have been relatively unaffected by human activities, and disturbance regimes have remained relatively intact. Yet, this approach cannot be carried over to where life and property are threatened, as well as where forests have been logged and deprived of fire for what is estimated to be over seventy years. Given these conditions, continued fire suppression will be required, but suppression alone will only exacerbate the growing problems, particularly in areas of overly dense stands and excessive fuels.

The historic vegetation structure and composition of Whiskeytown was created by a variety of disturbance regimes and many of the tools available for mimicking these processes lie within the disciplines of fire management. Given the narrow windows available in which fire management is able to execute prescribed burns, it is inconceivable that fire in its presettlement frequencies and severities could be restored fully. And prescribed fire alone cannot fully mimic the ecosystem functions of presettlement fire because the forests have changed greatly and the effects of reintroduced fire are likely to be quite different than those of presettlement fire. If fire alone is used, several applications of prescribed fire will be necessary, especially in densely stocked stands with heavy fuels concentrations, before the desired forest conditions can be approached. These

early reintroductions of prescribed fire are expensive and have a high risk of escapes as well as undesirable effects. Because of this, the National Park Service is considering the use of fire surrogate treatments that mechanically reduce fuel loads and tree stocking levels to decrease the probability of large intense fires, but also to pre-treat prescribed burn units so that prescribed fire can be safely reintroduced into these dense forests.

Mechanical thinning and chipping treatments can reduce wildland fire severity by making fires less intense and safer to control. In general, thinning can lower crown bulk densities and redistribute fuel loads significantly, thus decreasing fire intensities if the surface fuels are treated. These removals have been shown to be effective in reducing crown fire potential.

Similarly, thinning and chipping can mimic the effects of fire on structural patterns of woody vegetation, but without fire, the effects on nutrient cycling, hydrology, seed scarification, non-woody vegetation response, plant diversity, disease and insect infestation, and genetic diversity, are almost unknown. Because fire and thinning differ markedly in terms of these factors, including the potential for soil compaction and components of biomass removed from a site, both prescribed and managed wildland fires are proposed to assume a considerably expanded role for Whiskeytown.



Map of Whiskeytown National Recreation Area Region

Program goals

The Fire Management Plan goals describe what must be accomplished in order for the fire management program to be successful. The following seven goals were developed by National Park Service staff to reflect National Park Service policy as well as the comments received during public scoping meetings. These goals were used to formulate the alternatives analyzed in this draft Environmental Impact Statement for the Fire Management Plan:

Goal 1 Ensure that public and firefighter safety is the highest priority for all fire management activities.

Goal 2 Use fire to improve wildlife habitat, stimulate biodiversity, maintain healthy watersheds, reduce exotic plants, restore circa 1800 landscapes, and improve forest health.

Goal 3 Suppress undesirable fires in order to protect the public, property, and resources.

Goal 4 Reduce fire risk adjacent to developed areas, urban interface boundaries, and cultural/historical sites.

Goal 5 Foster and maintain interagency fire management partnerships and contribute to the firefighting effort at the local, state, and national level.

Goal 6 Develop Whiskeytown NRA staff expertise in all aspects of fire management.

Goal 7 Educate the public on the scope and effect of fire management programs.

Authority for action and related plans

This draft Environmental Impact Statement analyzes four alternative approaches to managing fire in the park. The alternative that is selected would be adopted as the new Fire Management Plan to guide the fire management program. Authority to develop a fire management program is derived from the National Park Service Organic Act (16 U.S.C. 1 et seq.), and in delegations of authority found in Part 245 of the Department of the Interior Manual. Director's Order 18 also provides guidance to National Park Service wildland fire management and Director's Order 12 guides National Park Service implementation of the National Environmental Policy Act (NEPA).

The Fire Management Plan for Whiskeytown National Recreation Area is being developed in coordination with other park planning documents, including the General Management Plan, completed in 2001. The General Management Plan provides overall direction to park activities. The plan states that the park would continue its wildland fire pre-suppression and suppression program, including efforts to reduce hazardous forest fuel buildup. Additionally, the General Management Plan states that the purpose of the fire management program would be expanded to improve wildlife habitat, stimulate biodiversity, maintain healthy watersheds, reduce exotic species, and restore circa 1800 landscape conditions reflecting American Indian fire practices (except in developed areas and designated cultural landscapes where target years may vary).

A Resources Management Plan for Whiskeytown completed in 1997 addresses the park's fire management program in more detail than does the General Management Plan. A Fire Management Plan that was written in 1985 and revised in 1993 guides the current fire management program in the park.

Additional planning would be required prior to implementing fire management projects described in this draft document if the potential for site- specific impacts is identified. For example, actions with the potential to impact federally listed threatened or endangered species would require compliance with the Endangered Species Act, and projects with the potential to impact cultural resources must comply with the National Historic Preservation Act. Additional site- specific analysis under NEPA may also be required if the potential for environmental impacts are identified but are not discussed in this document.

Decisions to be made

This draft Environmental Impact Statement analyzes four alternative approaches to fire management at Whiskeytown National Recreation Area. The park superintendent would use the information provided in this document, along with input received during the 60 day public comment period, to recommend to the Regional Director of the National Park Service which alternative should be selected. The selected alternative would update the Fire Management Plan and guide fire management in the park over the next four to seven years. A final Environmental Impact Statement would be released to respond to public comments. Following a 30- day public review of the final document, a Record of Decision would be signed to formally adopt the selected alternative.

Planning issues considered

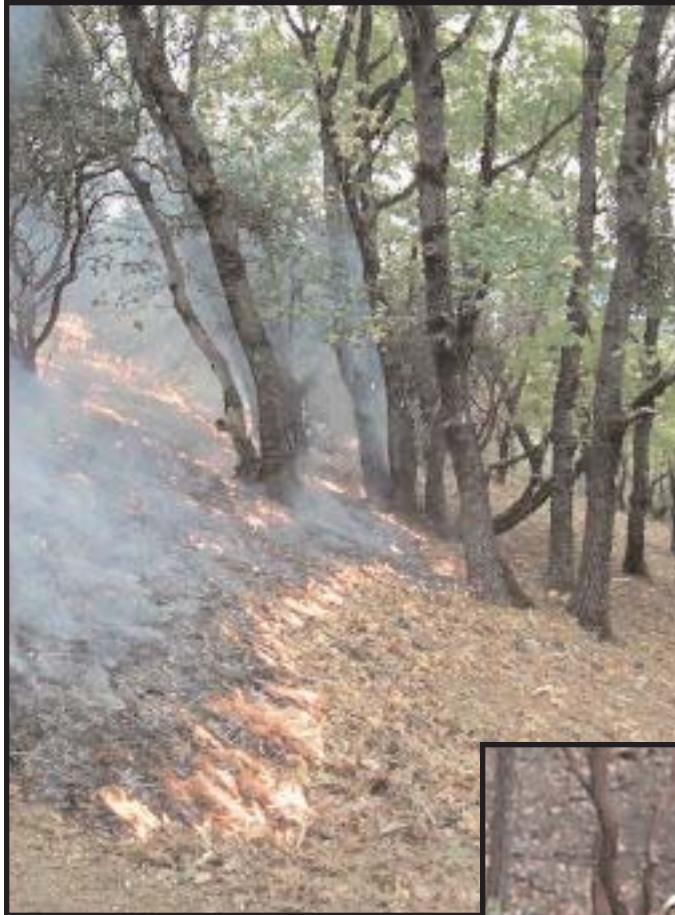
Issues are the concerns raised by park staff, other government agencies, and the public that were used to develop and evaluate the alternatives in this document. Concerns ranged from the impacts of wildland fire to the impacts associated with management actions taken to manage fire and reduce fuels. Planning issues discussed in this draft document include impacts to the biological environment (vegetation, wildlife), the physical environment (soils, geologic resources, water quality, wetlands/floodplains, and air quality), the cultural environment (cultural resources, sacred sites), and the social environment (health and safety, community economics, recreation, and visual resources). Impacts resulting from fire and fire management activities were analyzed for the following issues:

- Threats to human health, safety and property
- Alteration of historic fire regimes
- The unnatural accumulation of forest fuels resulting from fire suppression
- Smoke management/ impacts to air quality
- Accelerated erosion
- Soil compaction resulting from heavy foot traffic or equipment
- Impacts to water quality
- Changes in nutrient cycling
- Increased exotic species resulting from vegetation and ground disturbance
- Degradation of pre- historic and historic cultural resources
- Role of fire in managing resource procurement sites for Native Americans
- Impacts to old growth forest
- Impacts to sensitive, and federally listed threatened and endangered species
- Impacts to wildlife
- Impacts to vegetation

Impairment summary statement

The National Park Service must consider the impacts of each alternative to determine if the described action would lead to an impairment of resources per the Organic Act and General Authorities Act. If there would be impairment the action may not be approved. An impairment is (*the result of*) an action that would diminish in strength, value, quality and/or quantity the resources for which the park is responsible (Milestone 1995). In the context of this document, impairment would be a fire management action that would harm the integrity of park resources or values, including opportunities that would otherwise be present for the enjoyment of those resources or values. Not all impacts constitute impairment. Severity, duration, and timing of the impact help determine whether the integrity of a park resource or value would be irreparably compromised.

CHAPTER 2 THE ALTERNATIVES



Chapter 2: The Alternatives

This chapter describes the alternatives selected for analysis in the Whiskeytown Fire Management Plan Draft Environmental Impact Statement. Each alternative describes a strategy for managing fires and forest fuels. The use of prescribed, and managed- wildland fire, as well as mechanical methods to reduce forest fuels in developed areas and along park boundaries are included in this DEIS. A more detailed description of the effects on the environment follows in Chapter 4: Environmental Consequences.

Development of alternatives

An interdisciplinary team of National Park Service staff developed the alternatives described in this document with input from the public and other agencies. The interdisciplinary team was comprised of staff with expertise in fire management, wildlife, biology, botany, ecology, geology, safety, recreation, cultural resources, and public land policy and regulations. Public and interagency input was solicited and received through a scoping process that is described in Chapter 5 of this document.

Six different approaches to managing fire at Whiskeytown were identified through this process. Each alternative utilizes a combination of fire and fuels management strategies to meet the purpose, need and objectives of the fire management program. Four alternatives were kept for further analysis in this document, while two were dismissed from further consideration because they would not adequately meet Whiskeytown's fire management goals. Each alternative is described in greater detail in this chapter.

The alternatives described in this draft document were developed in accordance with resource management goals identified in the Park's 1999 General Management Plan. The General Management Plan states that the physical and biological systems of the undeveloped portions of the park would be managed to reflect early 1800 conditions and processes. The General Management Plan further states that the fire management program would continue wildland fire pre-suppression and suppression activities, including efforts to reduce hazardous forest fuel buildups. In addition to this, the purpose of the fire program would be expanded to:

- Improve wildlife habitat
- Stimulate biodiversity
- Maintain healthy watersheds
- Reduce exotic species
- Restore circa 1800 landscapes except in developed areas and designated cultural landscapes where target years may vary.

The General Management Plan also states that the park would improve forest health by:

- Developing and implementing a forest management plan
- Completing research on historic forest conditions
- Thinning and planting native species
- Restoring fire as a part of the natural system.

The National Park Service identified what fire and fuel management strategies are reasonably available to achieve park resource goals. The alternatives discussed in this document are comprised of varying combinations of these fire management and fire risk reduction strategies. Actions described for Alternative I are based on the park's current fire management program, and are included to provide a baseline against which the remaining alternatives may be compared. The strategies proposed for the various alternatives include the use of prescribed fire, managed wildland fire, and mechanical treatment to reduce hazardous fuel levels. Each of these strategies, and the issues generated by their consideration, are described below.

Suppression

Suppression is the activity most people associate with fire management. Suppression includes all actions taken to put out an active fire, and is defined as the restriction of the spread of a wildland fire and the elimination of all threats from that fire. Suppression is an appropriate strategy when human safety, property or park resources are threatened, or at risk. Trained fire management staff conduct fire suppression activities. Due to the unplanned nature of most wildland fire situations, and the need for a rapid response, the closest available fire-fighting resources are dispatched to wildland fire events. Local, state and federal agencies work together to effectively manage fire suppression activities using a formal incident command system.

A variety of techniques are used to suppress fire. Fire management professionals determine what would be the most effective and cost-efficient manner with consideration to public and firefighter safety and the protection of property and resources. Director's Order 18 mandates that the park develop and maintain a systematic process to determine the most appropriate management strategy for all unplanned ignition. Methods used to suppress wildland fires should minimize impacts of the suppression activities and the fire commensurate with effective control and resources value protected. Three terms that have been used to describe various levels of suppression activity are: contain, control, and confine. These terms are described below.

Contain means the fire is surrounded by a control line. A control line is any natural or human-constructed barrier that stops the spread of fire by providing a barrier that is devoid of fuels. Fire crews construct hand-line using chainsaws and hand tools to remove all surface fuels in a one to six foot wide strip down to bare mineral soil. Ladder fuels, such as shrubs and low branches, are removed or thinned over a three to twenty-foot wide strip as well. Bulldozers may also be used to construct control lines if necessary, although their use requires the approval of the park superintendent since resulting adverse resource impacts can be quite high. Control lines may be improved by adding a black-line by burning fuels next to the control line to further minimize the chance that wildland fire would cross the control line. A wet-line may also be used, which involves first dousing the approaching flames with water, and following up with construction of a control line. Fire management crews patrol the control lines to ensure that the fire does not cross over. The control line is monitored as long as fire remains active in the burn area.

Control means there is a risk of fire escape. Aerial suppression tactics may be used in addition to construction of control lines. Fire retardant chemicals, foam, and bucket drops of water with helicopters are typically used on the hottest areas to control the rate of spread, and these actions

are then followed by the construction of control lines. This approach is used in high- risk situations where it may not be appropriate to send in hand crews.

Confine means the fire is being kept in a specific location. This term usually applies to wildland fire use, where the goal is not to put out the fire but to manage it in a pre- determined location at an acceptable intensity.

Minimum Impact Suppression Techniques (MIST) are employed during suppression activities to minimize adverse resource impacts and limit the amount of disturbance required to manage wildland fire. Techniques include the use of existing natural or man- made firebreaks like streams, exposed rock, lakes, or roads instead of constructing control lines, and placement of control lines to minimize disturbance. MIST also includes removing trees, including snags, only when it is necessary to protect human safety. A variety of fire management activities exist that can provide for flexibility of MIST, including shaded fuel breaks, mechanical thinning, and prescribed fire. Such activities lower both the scale (size) and severity of fire suppression activities, thus altering suppression related impacts to all effected resources.

Wildland fire suppression activities typically last from one to five days, but may take longer. Following suppression of the fire, crews may rehabilitate impacts associated with suppression activities. Constructed hand- lines and bulldozed lines are treated to prevent accelerated erosion and prevent unintended visitor use. This can include scattering weed- free straw and some limited replanting. Hazardous trees located along roads and trails are also identified and removed. The effects of the fire itself are generally not rehabilitated. However, a Burned Area Emergency Response team may be employed if a high- intensity fire burns over a large area. A wildland fire suppression event is considered successful when the fire is stopped safely and efficiently with the minimum amount of impact and cost.

A variety of techniques are used to suppress fire. Fire management professionals determine what would be the most effective and cost- efficient manner with consideration to public and firefighter safety and the protection of property and resources. Three terms that have been used to describe various levels of suppression activity are: contain, control, and confine. These terms are defined earlier in this chapter.

Issues related to fire suppression activities at Whiskeytown National Recreation Area include:

Threats to human health, safety and property

All management actions involving fire have the potential to place firefighters and the public at risk. Ensuring that only trained staff are involved in suppression operations and that safety is given top priority when making fire management decisions minimizes the risk to firefighters. The risk to the public stems from the possibility of a wildland fire burning out of control and from impacts associated with smoke production. Programs that integrate a variety of tools and techniques for reducing fire risk provide managers with greater options relating to human health, safety and property.

Smoke management/ impacts to air quality

Air quality may be impacted by smoke production related to wildland fire. Few if any reasonable methods exist for mitigating smoke and air quality impacts during suppression events.

Impacts to Soil

Suppression activities result in the removal of vegetation along control lines and compaction of soils where heavy equipment and foot traffic occurs. These activities

contribute to accelerated erosion, increased soil bulk density, and other adverse soil impacts. Changes in nutrient cycling also occur as a result of fire or a lack of fire over the landscape. Many of these impacts are minimized through the development of a full range of strategic and tactical operations for the management of wildland fires. Additional steps to mitigate impacts to soil resources are made by rehabilitating control lines and other suppression related alterations after the burn is completed and preventing unintended visitor use of control lines as trails.

Impacts to water quality

Accelerated erosion may affect water quality. Additionally, fuel spills and fire retardant may have the potential to impact water quality. Adherence to minimum impact suppression techniques is a key to mitigating fire effects. Post-fire mitigation also mitigates effects to water quality. Alternatives that employ alternative fire risk reduction techniques limit the spatial scale of unplanned wildland fires, and thus are a form of mitigation.

Increased exotic species resulting from vegetation and ground disturbance

Construction of control lines may contribute to an increase in exotic species related to vegetation removal and ground disturbance. During extended attack, mitigation would include the potential for washing vehicles and equipment to limit this risk. Post fire rehabilitation along with follow-up monitoring and exotic plant control will mitigate most other significant effects relating to increased exotic species as a result of suppression activities.

Degradation of pre-historic and historic cultural resources

Pre-suppression planning and coordination is designed to avoid impacts to known resources, but fire suppression activities may impact undocumented pre-historic and historic cultural resources.

Impacts to sensitive, and federally listed threatened and endangered species

Fire suppression activities may have an effect on federally listed species. The impacts to sensitive, and federally listed threatened and endangered species will be mitigated by ??

Impacts to wildlife

Fire suppression activities may have an effect on park wildlife by altering vegetation that provides food and cover, but generally, this impact is limited in scope.

Impacts to vegetation

Fire suppression activities involve the removal or injury of vegetation to contain and control the spread of fire, as well as the alteration of soils that support vegetation. MIST will mitigate many of these impacts, as will post-fire rehabilitation. Alternatives that lower fire risk on a broad scale will allow for more flexibility in the application of MIST, but some impacts will be unavoidable, particularly in FMU 1.

Prescribed fire

Prescribed Fire is the use of management-ignited fire to meet specific resource goals and objectives under pre-defined fuel and weather conditions. These conditions are referred to as the "prescription." Several factors are described in a prescription, including fuel moisture, wind speed and direction, relative humidity, and temperature. Fire behavior is predicted using models that take these factors into account. Fire managers combine this information with professional

experience when deciding if the right conditions exist for a safe and effective controlled burn to occur. Other factors that are taken into account when deciding whether or not a prescribed fire would occur, or continue, include smoke dispersal, resource availability (crews & equipment), and regional fire risk

Prescribed fires are used to reduce forest fuels and associated fire risk and also to help restore forest structure to historical norms. The fire and natural resource management team at Whiskeytown evaluates the Park to determine what areas are appropriate for treatment. A burn plan is prepared when it is determined that a prescribed burn is the appropriate tool for achieving resource objectives. The burn plan includes the prescription, a description of the fuels, site-specific goals and objectives, smoke considerations, safety measures, implementation guidelines, a description of the resources needed, a contingency plan in case of fire escape, monitoring plans, rehabilitation measures, public notice requirements, and an overall risk analysis.

Burn unit boundaries are normally placed in strategic locations that are most easily defended. Ridges, roads, rivers, and rocky areas are used as boundaries alone or to complement constructed control lines. Construction of a control line on burn unit boundaries includes removing groundcover and scraping a one to six foot wide strip of earth to bare mineral soil to prevent a ground fire from leaving the pre-determined burn area. This occurs prior to ignition, and is rehabilitated within a week of project completion. Within the control line, ladder fuels (brush and low tree branches) are reduced for twenty to fifty feet to prevent a ground fire from burning up into trees and spreading through the canopy. Additional clearing of ladder fuels around high value or sensitive vegetation may also be completed in the interior of the unit. Burn crews use chainsaws and hand tools to construct control line. Bulldozers are not used when conducting prescribed fires. Fire hose is brought into high fuel density locations, and portable tanks filled with water are utilized to cool fires that burn too hot.

An Incident Action Plan is developed and implemented on the days that prescribed burns are conducted. This plan includes daily objectives, resource assignments, safety measures, medical plans, and a communication strategy. Fuel and weather conditions are monitored before ignition and throughout the day. Additionally, resource availability is determined, the site prepared, and an implementation checklist is completed (go/no-go) to determine whether or not to proceed with ignition. When conditions are correct, ignition proceeds with the careful application of fire by skilled fire management staff. On the ground ignition is commonly accomplished through the use of hand-held drip torches. Aerial ignition can occur if the terrain is steep, access to fire crews is limited, or a large area was planned for treatment.

Ignition is followed by constant evaluation of site conditions. Firefighters hold the fire within the burn unit to keep it manageable. The perimeter is secured to prevent fire from escaping the burn unit boundaries, and it is patrolled and monitored for the rest of the season while active fire or smoke remained.

During the prescribed burn, firefighters are stationed in and around the burn unit to ensure that the fire does not move beyond established control lines. Additionally, fire engines and water tenders are used to assist in controlling the fire. Fire management staff monitors and reports site conditions, and additional staff manages traffic conditions on park roads in the event that smoke impedes visibility along public transportation routes.

Once a prescribed burn is complete the control lines that were constructed to help contain the prescribed fire are rehabilitated. Rehabilitation includes removing garbage, flagging and hoses, and piling brush and placing plant litter over areas of bare mineral soil. Water bars are constructed where necessary, and actions are taken to prevent unintended visitor use of fire lines as trails to prevent accelerated erosion.

Permanent monitoring plots are established to record resource conditions both before and after a burn. This helps fire managers determine whether the prescribed fire has successfully met resource objectives, and increases staff knowledge of resource conditions. This is referred to as fire effects monitoring. Data collected includes tree mortality rates, fuel loading, species composition, species diversity, and the presence of exotic species.

Success for a prescribed burn is determined based on the safe, accident- free implementation of a burn plan, the accomplishment of fuel reduction and resource management goals, the minimization of smoke impacts, and the overall control of the fire.

Prescribed fire includes slash piles and landscape or broadcast burns. Slash burning is a component of each of the alternatives analyzed in this document. Slash piles are burned after mechanical or manual thinning treatments and are an effective method for reducing large or concentrated accumulations of fuel. Slash piles are located and designed to ensure safety and minimize resource impacts, thus are generally quite small and less than 10 cubic feet but can be as large as 1000 cubic feet if conditions are appropriate. Pile burning can occur during any time of the year but is normally conducted between the late fall through early spring when risk of escape is quite low. Extra care is provided during the spring season to avoid impacts to sensitive species.

Broadcast burning is used to reduce surface and ladder fuels over larger areas, and is used to introduce fire as an ecosystem process over a unit of area. When surface and lower ladder fuels like branches, needle, and leaf litter accumulate but can not be reduced by other means, prescribed fire can be used to consume portions of this plant material to reduce the fire risk. Prescribed fire is also appropriate for mimicking fire effects on a landscape scale by creating small patches that reduce the risk of large- scale fire and increase biological diversity. Broadcast burns are implemented in pre defined burn units located along the west, north, and east boundaries, and also in some interior portions of the park.

The preferred season for broadcast fire is the fall, after physiological dormancy of most plants has occurred, making them more resistant to fire effects. Typically, the window of opportunity during which prescription parameters are appropriate for implementation of a burn is relatively narrow, and may be limited to only a few days or a several weeks during a given year. Alternative opportunities for burning during which prescribed fires can safely be implemented are normally limited to a few days to weeks during the winter dormant through mid- spring non- dormant seasons.

Prescribed fire occurs under a controlled environment and on a limited spatial scale. Under such conditions, fire intensities and subsequent severities are generally low, with only isolated pockets of moderate to high severity effects. The resulting effects to resources such as vegetation, wildlife, soils, cultural resources, and water quality are relatively minor, and of much lower area and severity than would occur under most unplanned wildland fire scenarios.

Issues related to the use of prescribed fire at Whiskeytown National Recreation Area include:

Threats to human health, safety and property

All fire management actions involving active fire have the potential to place firefighters and the public at risk. Ensuring that only trained staff is involved in fire operations minimizes the risks to firefighters. Safety is stressed during all stages of a prescribed burn – before, during, and after ignition. The risk to the public stems from the possibility of a prescribed burn escaping its boundaries, and from impacts associated with smoke

production. Benefits of prescribed fire include a reduction in accumulated forest fuels and alterations in fuel continuity that can greatly reduce fire risk.

Smoke management/ impacts to air quality

Smoke management is an important component of prescribed fire management. Burn plans are designed to minimize smoke impacts. The Park works with regional air quality managers to comply with air quality laws and regulations, however, smoke is a part of conducting prescribed burns. Timing of burns is a primary method for mitigating these impacts. Additional impacts associated with this are discussed in more detail in Chapter 4.

Impacts to soil

Fire can burn at extremely hot temperatures, resulting in soil scorching that can create an impermeable layer that hinders the infiltration of water into the ground, increases susceptibility to erosion, and volatilizes certain plant nutrients. Prescribed fires are designed to burn at low intensities, and as such are a form of mitigation against high severity wildland fire. While some high severity effects may still occur in localized locations, these effects are generally much less occur as a result of unplanned fires. The construction of control lines, heavy foot traffic and vehicle traffic can also contribute to accelerated erosion. This is minimized by limiting the amount of time crews are present during site preparation and implementation of the actual burn, and by rehabilitating control lines after the burn is completed and preventing unintended visitor use of control lines as trails.

Impacts to water quality

Water quality may be negatively impacted if fire intensity or ground disturbance leads to accelerated erosion that deposits sediments into area watercourses or Whiskeytown Lake. There is also the potential for water quality impacts related to fuel spills from chainsaws, vehicles and other equipment. Additionally, impacts to water quality from aerial ignition delivery systems (ping- pong balls) are uncertain. Post fire mitigation will assist in mitigating these effects, but some impacts to water quality are expected. As with soil impacts, prescribed fires are designed to have much lower impacts than wildland fires, and can also reduce risks associated with a single high severity event adversely impacting an entire watershed.

Increased exotic species resulting from vegetation and ground disturbance

Exotic plant species invade disturbed areas and may spread into previously unaffected areas in the park. Prescribed fire creates a disturbance that may facilitate the introduction or spread of noxious exotic plant species. To mitigate this effect, pre and post- burn exotic plant removal occurs within and adjacent to all prescribed fire units. In addition, all vehicles used on prescribed fires are cleaned in the park's wash rack to lower risk of spreading existing or new exotic plant species.

Degradation of pre-historic and historic cultural resources

Known cultural resource sites are taken into consideration when planning prescribed burns. Impacts to unknown cultural resources are discussed in greater detail in Chapter 4.

Role of fire in managing resource procurement sites for Native Americans

Native Americans used fire to manage plant and wildlife resources. Whiskeytown National Recreation Area would incorporate management of Native American resource procurement sites into prescribed burn plans as appropriate. Collaboration with tribal groups would be necessary.

Impacts to sensitive, and federally listed threatened and endangered species

Prescribed burn plans are designed in coordination with the United States Fish and Wildlife Service, and park resource management staff to prevent adverse impacts to sensitive and federally listed threatened and endangered species.

Impacts to wildlife

Prescribed fire creates a short- term impact to wildlife that includes direct mortality, forced movement away from the prescribed burn area, or burrowing into the ground to escape the heat and smoke of the fire. Typically, the mosaic pattern of burning ensures that unburned gaps are retained, serving as refugia within the burn unit. Long- term benefits accrue from the use of prescribed fire when herbaceous plants re- sprout after the fire, and forest composition and structure is diversified. Creation of fire resistant gaps and the reduction of fire risk on a landscape scale also increases the probability that unburned or lightly burned refugia are created for wildlife species should an uncontrolled fire occur at some point in the future.

Impacts to vegetation

Individual plants can be killed or injured by prescribed fire. However, most species in the park are fire adapted, and would experience regenerative growth after the fire. Methods for mitigating the impacts to high value, old growth trees includes the removal of ladder fuels around selected, more vulnerable trees, and application of appropriate ignition techniques to lower fire intensity around high value, sensitive vegetation. Prescribed fire may be designed to mimic effects of historic fire occurrences by altering plant community composition and structure. A potential exists for prescribed fire to contribute to the presence or increased abundance of exotic plant species. Post- fire monitoring and exotic plant removal is a mitigation measure that can be employed to reduce this threat. This issue is discussed in more detail in chapter 4.

Mechanical treatment

Mechanical treatment is a term used to describe the application of various tools and equipment by fire and resource management staff to reduce fuels and to achieve fire and resource management goals. Specifically, mechanical treatments can be used to reduce fuels, to restore the historic composition and structure of plant communities, to reduce risks associated with large- scale, high severity fire events, and to construct shaded fuel break or fire control lines.

Mechanical treatment is an effective tool to meet fire management objectives in areas where the accumulation and arrangement of fuels prohibits the safe or cost effective application of prescribed fire, and in areas where fire use is otherwise inappropriate due to undesirable resource impacts and operational or other constraints. Mechanical treatment is used to reduce standing or downed fuels, such as brush, small and weakened or diseased trees, and the lower limbs of large trees. Certain areas within the park would be excluded from mechanical treatment. This includes areas with sensitive soils, steep slopes, sensitive species habitat, sensitive cultural resource sites, sacred sites, visually sensitive sites, and riparian areas. The removal of this live and dead vegetation reduces overall fuel levels and alters the horizontal and vertical continuity and

distribution of vegetation. Fire managers and natural resource staff may target particular species of plants for retention or removal to create vegetation communities that reflect a desired species composition and structure to reduce fire risk while promoting ecological health.

Mechanical treatment projects would be assessed at the site- specific level by qualified park staff for the presence of special status species, for significant cultural resources, and for any other resource concerns. Site- specific recommendations for protection of sensitive resources would be incorporated into project work plans and implementation.

Mechanical treatment units would be established in strategically important areas along or adjacent to ridges and roads, and in other areas where defensible space is needed. A site- specific prescription would be developed for each mechanical treatment project. This prescription informs workers what species should be removed or retained, and what the percent cover should be. In general, larger oak and pine trees would be left, with most brush cleared. Fifty percent of dead and down wood would be cleared. Tree limbs would be removed up to a set height to reduce ladder fuels. Crews would work on a project site for two to three months overall, but would only be in a particular area for approximately three to five days at a time.

In forested areas, mechanical treatment would favor the development of the dominant co- dominant trees where they exist by removing intermediate and suppressed trees and understory bush. This level of treatment would remove small- sized trees, mostly less than 12 inches in diameter at breast height, from the lower canopy, leaving large trees to occupy the site. Where larger trees were not present, smaller trees would be maintained. In brush dominated areas, mechanical treatment would favor individual species and retained vegetation by thinning out a portion of the vegetation. Treatments in both forest and shrub dominated areas could vary significantly in relation to site specifics and also to thinning method employed (see following discussion on mechanical treatment levels 1, 2 and 3).

These treatments effectively alter fire behavior by reducing crown bulk density, increasing crown base height, or changing species composition to lighter crown and fire- adapted species. Such treatments can reduce the severity and intensity of wildland fires for a given set of physical and weather variables.

Although thinning is thought to improve forest health, thinning activities can also act as a vector to spread pathogens. Prevention is difficult, as root pathogens spread to surrounding vegetation through root- to- root contacts, and can survive for decades in infected or dead root systems. The most effective approach currently known is to prevent infections. Mitigation includes borate treatment of freshly cut stumps to prevent their infection by pathogens such as annosus root disease, and care to avoid creating basal trunk wounds and open root wounds, which could serve as entry points for fungal infections. The most appropriate mitigation for bark beetles may be timely sanitation of large limbs and logs by felling and burning infested trees. Preventative methods, most of which aim at reducing the number of susceptible trees in the forest, are far more likely to result in a lasting reduction in tree mortality rates.

Thinning activities can disperse fungal spores of the white pine blister rust and other species, such as sudden oak death syndrome (*Phytophthora ramorum*). Fungal spores present in the soil can be transported on clothing, footwear, or equipment. White pine blister rust poses a potential threat to sugar pines, which make up a significant component of the mixed conifer plant community. White pine blister rust, caused by an introduced stem rust fungus, can weaken and predispose trees to bark beetle infestations or other pathogens. Few effective mitigation methods are available for white pine blister rust. Pine branches that are found to be infected can be pruned and disposed of, but this method is only effective if the trees are regularly inspected and if the

infection has not spread to the stem. Maintenance of a mixed species stand composition may help slow the spread. Some individual trees are thought to be resistant to the pathogen, but no such specimens have been identified in the park to date.

Sudden oak death syndrome would have devastating effects to plant communities in the park because tan oak, a major understory component of these forests, is perhaps the most susceptible species to this fungus. Although this disease is not presently known to occur within the park or on neighboring lands, an infection of tan oak within the park would have high severity effects on plant communities and wildlife, and would create a tremendous fire hazard. Ensuring clean equipment and monitoring for the early stages of infection are the only actions that can be taken to prevent introduction and limit its spread in case of infection.

Another potential consequence from thinning is that portions of the removed vegetation would significantly contribute to surface fuels (slash) if the cut portions are left on the forest floor. These fuels may have a major impact on expected fire intensities depending on where and how they are treated. Thinned materials can occur by one or many of the following: lop and scatter, chip and spread, extract from site, or pile and burn on or off- site.

The following ecological considerations would be incorporated into thinning operations in the park.

- As much as possible, maintain soil quality and nutrients by adjusting thinning rates to leave more small twigs, green leaves and needles which retain proportionately more nutrients than other portions of plants.
- Retain vegetative or litter cover over soil surface to minimize erosion
- Protect water quality and yield, and prevent floods and landslides by mitigating the adverse impacts of ground disturbance and providing undisturbed buffer zones along riparian areas.
- Conserve forest biodiversity by reducing habitat fragmentation by shaded fuel breaks, and avoiding thinning in vulnerable areas, such as old growth stands and riparian zones, and restoring natural structural complexity.
- Plan at the landscape level to address ecological concerns such as biodiversity, water flows, and forest fragmentation.
- Monitoring of mechanical treatment projects occurs to assess ecological effects. This includes documenting site conditions before and after project activity with photo- points, and also the use of the FARSITE simulation program.

The Wildland Urban Interface (WUI) initiative is a recent addition to the park's current fire management program. This program includes the construction of shaded fuel breaks in lower elevation forests and shrub communities to assist fire management staff in controlling the spread of wildland fire. Shaded fuel breaks are linear areas that are cleared of woody vegetation with the exception of selected overstory trees, and brush in areas where trees are not present. Width of shaded fuel breaks is 100 feet when positioned along ridge- tops and 200 feet when along roadsides. Mature trees provide shade, which helps keep surface fuels at a lower temperature than in shaded fuel breaks where no canopy is present. Retained vegetation also serves to reduce erosion and provide annual litter source to protect soil where an herbaceous cover is absent.

Each individual shaded fuel break is designed to fulfill one or more of the following purposes: Public Safety and Evacuation; Firefighter Safety; Access for Suppression Actions; Burn Unit Boundary; and/or Park Boundary Protection.

Shaded fuel breaks are designed to alter horizontal and vertical fuel arrangement by greatly reducing ladder fuels (brush, small trees and low tree limbs). This increases crown base height,

the gap between surface and ladder fuels, and reduces crown bulk density. This alteration is designed to reduce the rate of spread of fire across the shaded fuel break. Under certain conditions, an approaching crown fire would drop down to a ground fire when it encounters a shaded fuel break. This improves firefighter safety and increases the likelihood that a wildland fire may be successfully suppressed or confined, plus provides more options to employ MIST during unplanned fire events.

Shaded fuel breaks are not intended to stop an approaching fire alone, but are designed to facilitate rapid firefighter access so that an approaching wildland fire may be more safely and effectively suppressed or confined. Shaded fuel breaks can also serve as prescribed burn unit boundaries in support of management- ignited fires. (See Table on next page).

Table 2-1 Current Shaded Fuel Break System at Whiskeytown National Recreation Area

			Purpose				
	Shaded Fuelbreak Name	Total Size (acres)	Public Safety & Evacuation	Firefighter Safety	Access for Suppression Actions	Burn Unit Boundary	Park Boundary Protection
Ridge Top	Buck	21	No	Yes	Yes	Yes	Yes
	Buck Divide	36.1	No	Yes	Yes	Yes	No
	Bull *	20.7	No	Yes	Yes	Yes	Yes
	Eiger	19.3	No	Yes	Yes	Yes	Yes
	Ganim	19.3	No	Yes	Yes	No	No
	Kanaka East	28.8	No	Yes	Yes	Yes	Yes
	Kanaka South	17.6	No	Yes	Yes	Yes	No
	Kanaka West	20.1	No	Yes	Yes	No	Yes
	Monarch	30.7	No	Yes	Yes	Yes	No
	Mule	27.3	No	Yes	Yes	No	No
	North Kanaka	33.2	No	Yes	Yes	Yes	No
	North Star East	8.5	No	Yes	Yes	Yes	Yes
	North Star West	22.6	No	Yes	Yes	Yes	Yes
	Oak Bottom	8.8	No	Yes	Yes	Yes	No
	Orofino	17.9	No	Yes	Yes	Yes	Yes
	Panther	31.6	No	Yes	Yes	Yes	No
	Prospect	13.9	No	Yes	Yes	Yes	No
	Roost	16.5	No	Yes	Yes	Yes	No
	Shasta Divide	38.9	No	Yes	Yes	Yes	Yes
	South Fork	36.3	No	Yes	Yes	Yes	No
	South Fork Spur	0.6	No	Yes	Yes	No	No
	Southwest Roost	8.1	No	Yes	Yes	Yes	No
	Sunshine	19.6	No	Yes	Yes	Yes	No
Roads	Bldgs 318-324	17.4	Yes	Yes	Yes	No	No
	Kennedy Mem Dr	38.1	Yes	Yes	Yes	Yes	No
	Muletown Road	50.1	Yes	Yes	Yes	Yes	No
	Pioneer Rd	34.6	Yes	Yes	Yes	Yes	No
	North Muletown Rd	40	Yes	Yes	Yes	Yes	No
	Paige Bar Road	66.3	Yes	Yes	Yes	Yes	No
	Post Office Road	35.1	Yes	Yes	Yes	Yes	No
	South Shore Drive	140.6	Yes	Yes	Yes	Yes	No
Total Acreage		919.6	* Indicates shaded fuelbreak with mid-slope sections				

Three levels of mechanical treatment are being considered at Whiskeytown, Levels 1, 2, and 3.

Level 1 mechanical treatment includes the use of chain saws, weed-eaters, hand crews, and chippers to clear around buildings, to install and maintain shaded fuel breaks, and to clear along roadways. While treatment area would vary, this level is included in all four alternatives. Cleared fuels can be treated by one or many of the following: chipped and left on site, burned in piles, extracted from sites, lopped and scattered. Rehabilitation of areas treated at Level 1 would include raking and scattering organic materials in piles that burned hot, and rehabilitation of foot trails. Level 1 mechanical may also be used to reduce ladder fuels as a pretreatment to lower fire severity during future application of prescribed fire, and as an understory thinning treatment in larger units.

Thinning would focus primarily on removal of small size class understory trees and shrubs, diseased or infected vegetation, and high density forest stands. A site specific plan would be prepared for all new projects, listing sensitive species, target species, and other relevant prescription parameters.

Ecologically, this form of mechanical treatment provides the most flexibility; thinning practices can be modified to develop mixed species stands, multiple canopy layers, and a more diverse understory. If followed by prescribed fire, this level of thinning can promote the regeneration of shrub understory and create stand characteristics favorable to biodiversity, wildlife, and aesthetics. Parameters such as evaluation of the number of snags, live trees with cavities, and large downed wood (greater than 13 inches DBH—diameter at breast height) to leave, would be assessed on a site-by-site basis, due to the inherent variability across the landscape.

When compared to other levels of mechanical treatment, Level 1 thinning would result in the least amount of soil compaction and disturbance, spread of exotics and pathogens, and would have negligible damage to residual trees. Thinning would improve the overall forest health by lessening competition in these overly dense forest stands with increased susceptibility to insects and pathogens. Although thinning alone would not prevent bark beetle infestation, the probability is decreased when thinning is combined with prompt sanitation measures and undamaged residual trees. Site-specific goals would be established to specify the density of trees to leave.

Level 2 mechanical treatments would include the use of brush-reduction machinery to grind and shred brush. Projects would occur on slopes less than 30%, primarily during the summer and fall months when soil moisture content is appropriate. No Level 2 treatments would occur on decomposed granite soils. The machinery used would consist of wheeled or tracked vehicles with brush cutting, thinning, or shredding heads that are attached directly to the machine, attached to the boom, or machine pulled. Maximum soil compaction rating of allowed machinery would be 5 pounds per square inch. This equipment would be used primarily in mixed brush woodlands where brush and tree individuals are common. Machinery access trails would be rehabilitated to prevent erosion after treatment.

Level 2 mechanical treatments would be used to reduce cover of shrubs and small trees. This treatment would significantly reduce fire risk by redistributing ladder fuels that contribute to high severity crown fires. Although level 2 mechanical fuel treatments significantly reduce ladder fuels and crown fire potential, they can create a hotter and drier microhabitat and increase the level of surface fuels that may exasperate surface fire potential under drought conditions.

The slash generated by level 2 treatments would create a barrier that would likely limit the germination of seeds and emergence of seedlings. Depending on the depth and compaction of the slash, it is probable that this level of treatment would favor retained vegetation and those

species that re- sprouted, although re- sprouting may be affected by the season when brush is removed. Within three to five years, decomposition would have reduced wood chips and herbs would have the ability to proliferate if seed source is available. The redevelopment of surface fuels in the treated areas would be relatively slow, and repeat treatments should not be required at frequent intervals.

Slash would be piled to a depth of no more than 3- 4 inches to prevent inhibited root- growth in trees remaining in, and adjacent to, the treated area. The restoration and maintenance of structural diversity and large downed wood would be taken into consideration when planning Level 2 treatments to benefit wildlife.

Machinery used for Level 2 mechanical treatments would be washed to decrease the likelihood that seeds from non- native plants would be physically transported by equipment. Seeds may travel with any soil particle moved from an infested area. Once an infestation of invasive non- native species is established it is highly persistent and can spread rapidly. However, depending on the depth and compaction of the slash resulting from fuels treatment, it is possible that seed germination would be inhibited. Establishment and competition by wind dispersed exotic annual grasses is of additional concern because these species compete against native herbaceous and woody species, and also contribute to fine fuel loads.

Prescribed burns that are planned in treated will be low intensity burns that are not conducted when fuel moisture is high in order to prevent severe soil impacts, eradication of the site's seed bank and 'cooking' roots of retained plants.

Brush mastication would increase the chance of infestation by forest pathogens by decreasing plant density and improving the health of residual species. However, treatments may also act as a vector to pathogen infestation if residual plants are damaged and if soil and duff moisture is significantly increased. Care must be taken to avoid creating basal trunk wounds, which serve as entry points for fungal and beetle infections.

Level 3 mechanical treatment is the use of machinery to remove brush and small- diameter trees. The size of individual trees removed would vary by species and focus on trees smaller than 12 inches DBH. This strategy would be used in the construction of shaded fuel breaks and to thin understory and overstocked stands. Thinning treatments would focus on the removal of smaller diameter trees that function as ladder fuels. This would help to protect park resources from large high severity crown fires by altering fuel composition and structure. Treatments would also increase forest health by reducing competition for available plant resources such as moisture, light, and soil nutrients. Such thinning would be used to restore the natural structure and composition of dense forests created by decades of fire suppression. Projects would occur in ponderosa pine, mixed conifer, and knobcone pine plant communities on slopes less than 30%. Work would occur during the summer and fall months when soil moisture content is within tolerance to limit soil compaction.

The machinery consists of tracked or wheeled vehicles with attached felling and processing heads. Small- scale yarders would also be included. Existing skid roads and log landing areas would be used. No new roads would be constructed. Machine access routes and ground disturbance would be rehabilitated after Level 3 mechanical treatment occurred.

Biomass generated by level 3 treatments may be removed from the project sites and used to produce wood products or fuel for co- generation plants supplying electricity. Site specific prescriptions would be developed to ensure that adequate materials remain on- site to meet wildlife needs, to ensure nutrient cycling, and to prevent accelerated erosion. Excess slash material would be treated to prevent an increase in surface fuels resulting from level 3 treatments.

Machinery used for level 3 mechanical treatments would be washed to decrease the likelihood that seeds from non- native plants would be physically transported by equipment. Seeds may travel with any soil particle moved from an infested area. Once an infestation of invasive non-native species is established it is highly persistent and can spread rapidly.

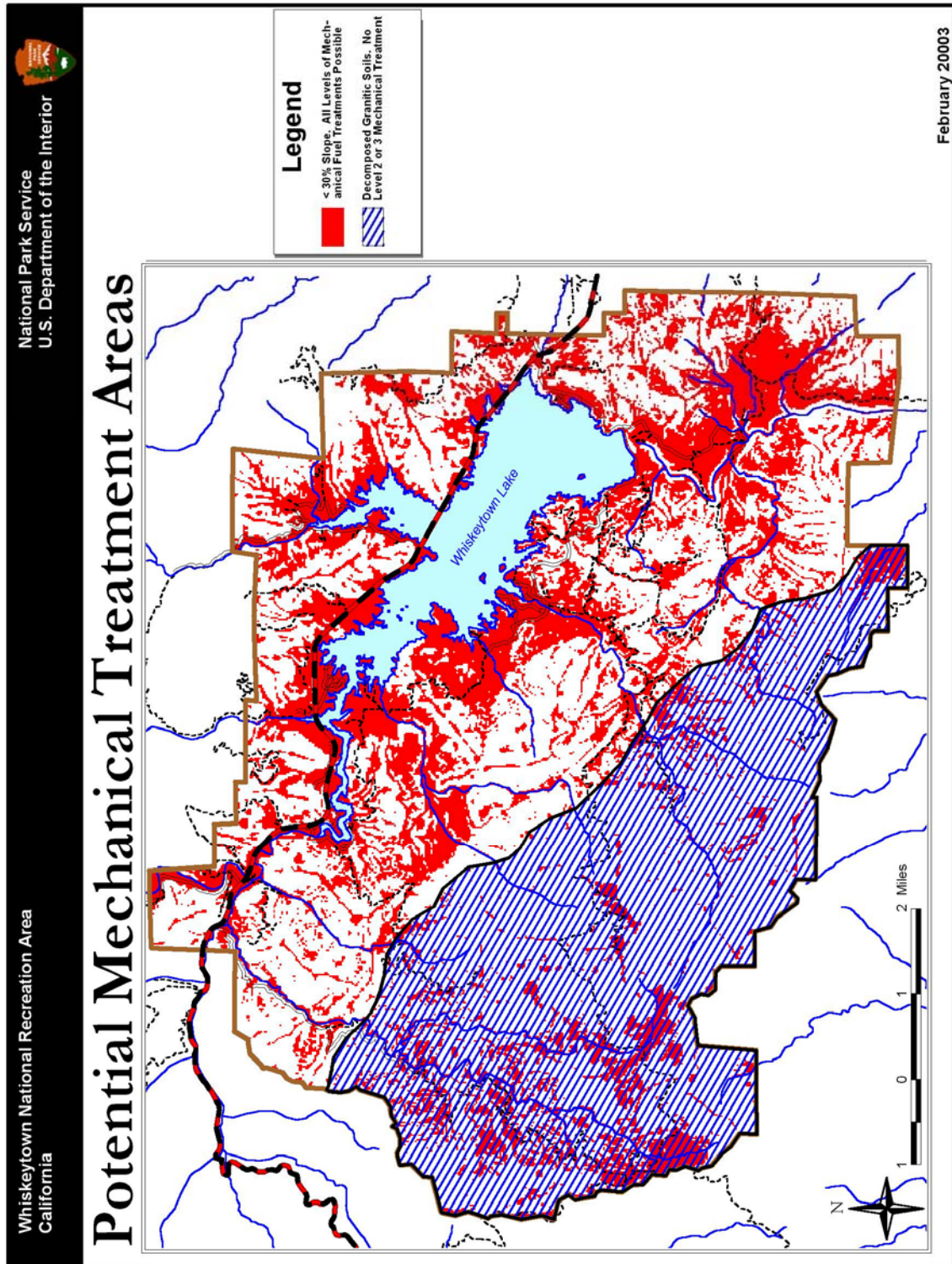
Level 3 treatments followed by fire may promote invasive and undesirable plant species by eliminating the native seed bank and creating open, disturbed areas that favor exotics. Prescribed burns that are planned in treated areas would be low intensity burns that are not conducted when fuel moisture is high, in order to prevent eradication of the site's seed bank. Wind dispersal of exotic annual grasses is of concern because these species compete against native herbaceous and woody species, and also contribute to more frequent fires.

Level 3 treatments to thin dense forested areas would decrease the chance of infestation by forest pathogens by reducing plant density and improving the health of forest species. However, they may also act as a vector to infestation if residual plants are damaged. Care must be taken to avoid creating basal trunk wounds, which serve as entry points for fungal and beetle infections. Once established, it is difficult to prevent the spread of some fungal infestations because root pathogens spread to surrounding trees through root- to- root contacts, and can survive for decades in infected or dead root systems. The only approach currently effective is to keep infections from occurring in the first place.

In addition to this, equipment must be kept clean and project sites must be monitored for the early stages of white pine blister rust and other disease species, such as sudden oak death syndrome (*Phytophthora ramorum*).

Certain areas within the park would be excluded from mechanical treatment. These include areas with sensitive soils, steep slopes, sensitive species habitat, sensitive cultural resource sites, sacred sites, visually sensitive sites, and riparian areas.

Mechanical treatment unit boundaries would be established in strategically important areas along ridges and roads, and in other areas where defensible space for shaded fuel breaks is needed. A site- specific prescription would be developed for each mechanical treatment project. This prescription informs workers what species should be removed or retained, and what the percent cover should be. In general, oak and pine trees would be left, and brush would be cleared. Fifty percent of dead and down wood would be cleared. Tree limbs would be removed up to a set height to reduce ladder fuels. Crews would work on a project site for two to three months overall, but would only be in a particular area for approximately three to five days.



Map of Mechanical Treatment Areas in Whiskeytown National Recreation Area

Issues related to Mechanical Treatment at Whiskeytown National Recreation Area include:

Threats to human health, safety and property

It is necessary for equipment operators to be trained in the correct use of mechanical equipment to ensure worker safety.

Soil impacts

The removal of surface vegetation may contribute changes in thermal, hydrologic, biologic, and chemical characteristics of soil. Use of certain types of equipment, and repeated vehicle or foot traffic may also contribute to compaction and accelerated erosion. These factors can alter soil properties thus affecting water quality and vegetation. Avoidance of sensitive soils and steep slopes is a primary mitigation measure to limit these impacts.

Impacts to water quality

Fuel spills from equipment used for mechanical treatment may occur. Additionally, alterations in to soil chemistry and accelerated erosion from mechanical treatment activities may result in downstream impacts to water resources. Mitigation measures will include avoiding sensitive watersheds and limiting spatial and temporal extent of area treated in any given watershed.

Increased exotic species resulting from vegetation and ground disturbance

Removal of vegetation and ground disturbance activities may contribute to an increase in exotic species. Mechanical treatment prescriptions will recognize the need to maximize retained vegetation canopy cover as a means to limit this threat. Additional mitigation to limit exotic species includes the application or retention of a soil mulch where facilitated access exists. Pre and post- treatment exotic species removal are additional methods that would be employed to mitigate the threat associated with exotic plant species.

Degradation of pre-historic and historic cultural resources

Known pre- historic and historic cultural resources would be protected during mechanical treatments. Crews conducting mechanical treatments may identify previously unidentified cultural resources. Shaded fuel breaks may provide easier access to cultural resource sites. Unintentional damage to undocumented resources may occur as a result of mechanical treatment if a sensitive resource is disturbed by heavy equipment. Surveys would be conducted to avoid resource damage.

Impacts to sensitive, and federally listed threatened and endangered species

Mechanical treatments would be planned in coordination with wildlife specialists to prevent impacts to federally listed threatened and endangered species and their critical habitat.

Impacts to wildlife

There would be short- term impacts to wildlife in the immediate area of mechanical treatments due to noise disturbance. Other impacts related to the alteration and removal of vegetation are discussed in Chapter 4.

Impacts to vegetation

Individual plants would be removed, and portions of plant communities would be altered. This process would benefit retained species by reducing competition for available soil nutrients and water, and by decreasing fire risk. Injury to retained

vegetation during operations would have the potential to result in delayed mortality, and increases in forest pathogens through cut stumps or fresh injury scars. Utilization of light on the land machinery will help reduce this threat. Additional discussion of mitigation is included earlier in this chapter by treatment level (1- 3). Impacts are discussed in greater detail in Chapter 4.

Wildland Fire Use

Wildland Fire Use is defined as the management of lightning ignited wildland fires to accomplish resource management goals in pre- defined geographic areas. It is an intensively managed process that incorporates formalized decision making to minimize adverse impacts of wildland fire to park resources or adjacent landowners.

Director's Order 18 mandates that the park develop and maintain a systematic process to determine the most appropriate management strategy for all unplanned ignitions, including the consideration of fire for resource benefits. National Park Service fire management staff would manage Wildland Fire Use in coordination with other neighboring agencies. As with the use of prescribed fire, Wildland Fire Use would require defined goals and objectives, and monitoring to determine if goals were being met. Depending on fire behavior and fuel conditions, management activities related to Wildland Fire Use would range from monitoring fire effects and behavior, to construction of control lines to confine the fire to active control of the rate of spread. Contingency plans would be developed to manage the fire in the event that it was no longer meeting prescription. This could include burning- out some areas to reduce fuels, assigning crews and engines, and partial to complete suppression in areas where fire is not currently or expected to meet goals/objectives.

When deciding whether or not to allow a wildland fire to burn, the park would analyze several factors. This would include establishing whether or not the fire is in prescription. Site- specific and regional weather forecasts would be consulted, fire potential would be estimated, fuel conditions would be measured, smoke dispersal would be monitored, available staff and equipment resources would be assessed, regional fire danger would be considered, and political feasibility would be determined. On- site data would be gathered within 24 hours to determine if a wildland fire were in prescription. Long- term risk assessment would be evaluated using computer programs (FARSITE, etc). Daily validation by the Superintendent would be required to continue managing a wildland fire for resource benefits. A fire would be suppressed at any time when risks were unacceptable or resource goals were not being met.

Wildland Fire Use is being considered in Alternative IV as an additional fire management tool that the Park may use to reduce the accumulation of forest fuels and to restore fire to the ecosystem. This use would be limited to higher elevation mixed conifer and ponderosa pine forests of FMU- 2 where most mechanical and prescribed fire treatment alternatives are considered inappropriate due to sensitive soils, limits on accessibility, or other resource and management constraints.

Wildland Fire Use projects are, by definition, random natural events. History and experience at other parks with natural fire programs shows that most natural ignitions (>90%) remain quite small (<0.1 acres). However, many parks with such programs have higher elevations with sparse fuels, cooler temperatures, higher relative humidity, more natural barriers, and fewer constraints on allowing fires to burn than would be the case at Whiskeytown. Ignitions may grow to an average of several hundred acres before going out. From fire management records at Whiskeytown, it is estimated that wildland fire use in the park would normally be 250 acres or less, and would last for duration of 1- 14 days. It is not expected that Wildland Fire Use would be

available as a management tool on a regular basis, since it is recognized that the appropriate conditions for this fire management strategy would not exist very often.

Whiskeytown would develop a reliable vegetation and fuel- model map before embarking on a wildland fire use program. This would assist in predicting fire behavior using computer simulation programs that utilize geographic information system data layers. By using predicted weather and long- term historical fire weather data, relatively accurate projections can be made as to how and where a fire may burn over a given time period.

Rehabilitation efforts following a managed Wildland Fire would be the same as for a prescribed fire. This includes removing garbage, flagging and hoses; and piling brush and placing plant litter over areas of bare mineral soil. Water bars would be constructed if necessary, and actions taken to prevent unintended visitor use of fire lines as trails to prevent accelerated erosion. National Park Service policy is to address the effects of fire management activities, not the effects of fire, which is viewed as a natural disturbance process.

The level of success for a managed wildland fire would be determined based on the demonstrated ability to manage the burn safely, the minimization of smoke impacts, and the overall control of the fire. Additionally, resource conditions would be monitored during and after a fire to assess whether fuel reduction and resource management goals were met.

Naturally ignited fires would be allowed to burn under limited conditions in the fire use zone and would be managed for resource benefit to assist in shaping the ecosystems of the future. Vegetation types that would exist in the fire use zone include most of the mixed conifer community, most of the upper elevation chaparral, a moderate portion of the of the ponderosa pine, and minor components of the mixed oak woodland and riparian communities. The prescriptions associated with these fires would ensure that the fire:

- Does not threaten life or property
- Stays within a delineated area within Whiskeytown
- Results in vegetation changes that move the landscape toward circa 1800 conditions
- Does not damage historic or cultural resources

All potential wildland fire use fires would require a wildland fire implementation plan to be in place and be coordinated with local interagency cooperators to assure a high degree of success and support.

Potential benefits of a wildland fire use program are many. From a fire risk reduction standpoint, wildland fire use will result in patches of low intensity fire that breaks up fuel continuity, thus lowers risk of large scale, high severity fire events. Ecologically, this results in the establishment of more fire prone locations that can serve as refugia for wildlife species, an increase in structural diversity of forest ecosystems, and greater resistance of forest stands to potential stand replacing fire.

Issues related to Wildland Fire Use at Whiskeytown National Recreation Area include:

Threats to human health, safety and property

All fire management actions involving live fire have the potential to place firefighters and the public at risk. Ensuring that only trained staff is involved in fire operations minimizes the risks to firefighters. Safety is stressed during all stages of a managed wildland fire. The risk to the public stems from the possibility of a wildland fire escaping its boundaries, and from impacts associated with smoke production. This is discussed in more detail in the wildland fire/escape fire scenario, and in Chapter 4 dealing with environmental consequences.

Smoke management/ impacts to air quality

Smoke management is an important component of fire management. Implementation plans are designed to minimize smoke impacts, and the Park works with regional air quality managers to comply with air quality laws and regulations. However, smoke is a component of wildland fire use. Impacts associated with this are discussed in more detail in Chapter 4.

Impacts to soil

Fire can burn at extremely hot temperatures, resulting in soil scorching that can create an impermeable layer that hinders the infiltration of water into the ground, increases susceptibility to erosion, and volatilizes certain plant nutrients. Wildland fire use fires are conducted at lower intensities than a high severity wildland fire, although some high severity effects may still occur in localized locations. Under some scenarios, the construction of control lines is required with the potential to contribute to soil compaction and accelerated erosion, although usually the level of line construction is very low. These impacts are minimized by limiting the manipulations plus the amount of time crews are present in a site, and by rehabilitating any control lines after the burn is completed and preventing unintended visitor use of control lines as trails.

Impacts to water quality

Water quality may be negatively impacted if fire intensity or ground disturbance leads to accelerated erosion that deposits sediments into area watercourses or Whiskeytown Lake. There is also the potential for water quality impacts related to fuel spills from chainsaws and firefighter vehicles.

Increased exotic species resulting from vegetation and ground disturbance

Exotic plant species invade disturbed areas and may spread into previously unaffected areas in the park. Fire creates a disturbance that may facilitate the introduction or spread of noxious exotic plant species. Post-burn monitoring and removal of exotic plants will be conducted on all wildland fire use fires.

Degradation of pre-historic and historic cultural resources

Known cultural resource sites are taken into consideration when planning management of a wildland fire. Impacts to unknown cultural resources, and impacts related to a fire that burns at a higher intensity than predicted are discussed in greater detail in Chapter 4.

Role of fire in managing resource procurement sites for Native Americans

Native Americans used fire to manage plant and wildlife resources. Whiskeytown National Recreation Area would take Native American resource procurement sites into consideration when managing wildland fire use. Collaboration with tribal groups would be necessary.

Impacts to sensitive, and federally listed threatened and endangered species

Wildland Fire Use would be managed in coordination with the United States Fish and Wildlife Service, and park resource management staff to minimize adverse impacts to sensitive and federally listed threatened and endangered species.

Impacts to wildlife

Managed wildland fire use creates a short-term impact to wildlife that includes direct mortality, forced movement away from the fire area, or burrowing into the ground to escape the heat and smoke of the fire. The scale and pattern of burning ensures that adverse effects are very limited and localized. Long-term benefits accrue from the use of prescribed fire when herbaceous plants resprout after the fire, and forest composition and structure is restored to a more natural state reflecting the reintroduction of fire as a natural process. Creation of fire resistant gaps and the reduction of fire risk on a landscape scale also increases the probability that unburned or lightly burned refugia are created for wildlife species should an uncontrolled fire occur at some point in the future.

Impacts to vegetation

Individual plants would be injured or killed by wildland fire. However, many species in the park are fire adapted, and would survive or experience regenerative growth after the fire. Managed wildland fire would most closely mimic historical processes that were responsible for the development and maintenance of the park's ecosystems, in particular the park's old growth forests.

Actions common to all alternatives

The actions described in the subsections below are a component of each of the four alternatives considered in this draft document. All fire management activities at Whiskeytown are coordinated and implemented by a professional fire management staff in coordination with natural and cultural resource specialists. The National Park Service fire management team at Whiskeytown NRA consists of the positions listed below:

Fire Management Officer, Fuels Specialist, Fuels Technician, Engine Captain, Fire Use Module Leader, Assistant Engine Captain, Assistant Fire Use Module Leaders, Fire Information/Education/Prevention Specialist, Geographic Information System Specialist, Fire Ecologist, Fire Archeologist and Archeology Technician, Fire Engine Operator, Senior Firefighters, Fire Program Assistant, and Fire Program Clerk.

The park employs a seasonal crew of firefighters to supplement permanent staff during the fire season, and Whiskeytown staff from other divisions trained in fire management actions also assist the fire program as needed.

Other agencies are also involved in the planning and execution of fire management actions in the park. These include the United States Forest Service, the Bureau of Land Management, the California Department of Forestry and Fire Protection, and the Western Shasta Resource Conservation District. Work crews from the California Conservation Corps are utilized, as are additional crews that are hired on contract.

Suppression

Suppression is the activity most people associate with fire management and includes all actions taken to put out an active fire, and is defined as the restriction of the spread of a wildland fire and the elimination of all threats from that fire. A description of suppression actions is discussed previously in this chapter under the "Development of Alternatives" and should be referred to for specific components associated with this management activity. Alternatives that include fire risk reduction treatments and shaded fuel breaks will provide for a greater range of suppression options.

Prescribed fire

Prescribed Fire is the use of management- ignited fire to meet specific resource goals and objectives under pre- defined fuel and weather conditions. It is a component of each of the alternatives analyzed in this document, although significant differences do exist among the alternatives. A general discussion of prescribed fire can be found in the development of alternatives section at the beginning of this chapter. The specific use of prescribed fire, ranging from small pile burning projects to larger broadcast burns, is described in greater detail for each alternative.

Mechanical treatment level 1

Mechanical treatment is a term used to describe the application of various tools and equipment by fire management staff to reduce fuels and achieve fire management goals. Three levels of mechanical treatment are being considered at Whiskeytown, but level 1 mechanical treatment is the only type of mechanical treatment common to all four alternatives. Significant differences in level 1 treatment do exist among the alternatives. A general discussion of mechanical treatment 1 can be found in the development of alternatives section of this chapter.

Fire information and education

The National Park Service manages an active fire information/education program in the PARK. The park staff includes a Fire Information and Education Specialist in response to growing responsibilities as a result of the Wildland Urban Interface Initiative. This position assists in educating NPS employees, and volunteers, concession employees, cooperating association employees, other agencies, park visitors and the general public about fire management goals and policies.

- Education and information on the fire management program will be accomplished in several ways.
- Fire education programs presented to park visitors, such as the junior firefighter program, evening programs, and guided walks.
- Fire education and prevention outreach programs presented throughout the year to schools, community groups and other organizations. The Fire Information Specialist would work with other government and local agencies in the presentation of these programs.
- The media are kept informed of the park's prescribed and wildland fires.
- Bulletin boards and displays on fire and the fire management program would be placed at visitor contact areas, such as the Visitor Center, Headquarters and the campgrounds. Educational displays on fire topics used at job fairs and special events as appropriate.
- Park brochures, handouts, park newspaper articles, press releases, fire fact sheets and park planning documents contain information on fire programs and would incorporate fire messages.

Relocate fire cache to Oak Bottom and build new administration building at park headquarters

The park General Management Plan (2001) identified both the need for replacing the current decentralized fire cache and developing a modern park headquarters facility.

The fire cache is currently dispersed in five different buildings in three locations: park headquarters compound, Whiskey Creek area, and in the Oak Bottom area. The relocation of the

Whiskeytown fire cache building from the park headquarters compound and construction of a new fire cache in the Oak Bottom Campground/Marina area is a component of each alternative. Fire cache buildings at headquarters and the Whiskey Creek area include a rented office trailer, a former residence, and three separated fire engine bay buildings. Equipment used by fire fighters is stockpiled where space is available—this often means spreading equipment storage across the park.

The development of a new, centralized fire cache will mean improved coordination between the hazardous fuels/suppression crews, the fire use module and administration functions for the fire management program. Relocating the fire cache to the Oak Bottom recreational complex location would greatly improve operational efficiency of the fire management program by consolidating resources in one central location and providing close proximity to the highest risk wildland fire area. Furthermore, the current park headquarters is too congested to have all park functions in the headquarters compound. Limited employee parking and increased staffing has forced the fire program to move to vacant buildings in disparate areas of the park. Public education of wildland fire safety and the role of fire would also be facilitated by relocating the fire cache in close proximity to the popular Oak Bottom RV and campsite areas. Building plans for a new fire cache have already been developed, although a site design for the Oak Bottom facility would need to be completed in the future.

In the late 1950's the Bureau of Reclamation bulldozed the current park headquarters compound and developed a temporary engineer office and vehicle yard. The National Park Service 'inherited' these assorted temporary buildings from the Bureau of Reclamation's dam construction phase. Office space at the headquarters compound consists of the Bureau of Reclamation buildings, converted park employee housing, and temporary trailers. Over the years since the National Park Service has been at Whiskeytown (since 1965), staff has increased with increased visitation demands. The limited space in the headquarters compound and deteriorating construction of the park administration building is a serious concern. Construction of a new fire cache in the Oak Bottom area would alleviate space constraints that restrict development of a modern park headquarters administration building. With the fire management staff and equipment moved to Oak Bottom, areas currently occupied by this staff could then be occupied by park administrative staff while demolition of the current building and construction of a modern facility occurs.

In January 2001, a planning charret for park headquarters was held to review alternative and develop conceptual alternatives for the headquarters area. During that meeting, it was determined that the current headquarters compound is too small for both a fire cache and an administrative building and that park buildings don't currently accommodate staff needs. Under each of the action alternatives, the park's current General Management Plan will be amended to clarify that the National Park Service would have the option to consider in its range of alternatives the construction of a new administrative building at the park headquarters on Kennedy Memorial Drive.

Relocation and construction of a new fire cache in the Oak Bottom area, and future improvements of the park's administration building at headquarters in its current location is expected to affect approximately six acres—all within currently developed and highly disturbed areas.

Alternative I: No Action (Current Program)

The National Environmental Policy Act requires that environmental analysis documents include a No- Action alternative. The No- Action alternative for plan modifications, such as the proposed update of Whiskeytown's Fire Management Plan, assumes that no new actions would be taken. This does not mean that the National Park Service would not take "action" to manage fire at Whiskeytown. The no action alternative would continue the current fire program.

Alternative I is the No- Action alternative for this analysis. If this alternative were chosen, the National Park Service would continue to manage Whiskeytown's fire management program in the park in accordance with the existing Fire Management Plan. This alternative is included to provide an accurate baseline against which other alternatives may be compared.

The current fire management program utilizes a limited range of fire management strategies - including prescribed fire, Level 1 mechanical treatment, and suppression of all wildland fires (including natural ignitions). Discussions of the general strategies are provided earlier in this chapter under the development of alternatives section. Implementation of these strategies specific to this alternative is described below.

Prescribed fire

The current program includes both broadcast and pile burning components, with prescribed fire projects range in size from 0.5 to 1000 acres occurring in all vegetation types. Slash piles are burned after mechanical treatments in shaded fuel breaks and around improvements. Broadcast burning is used to reduce surface and ladder fuels over larger areas. Projects located within prescribed fire burn units occur during the non- dormant season from 0- 5% of the time. Projects located in shaded fuel breaks occur during the non- dormant season 20- 30% of the time. This activity is conducted in accordance with the current Shaded fuel break Maintenance Prescribed Burn Plan. Maximum burning in a given year under this alternative would be 1400 acres.

Wildland fire use

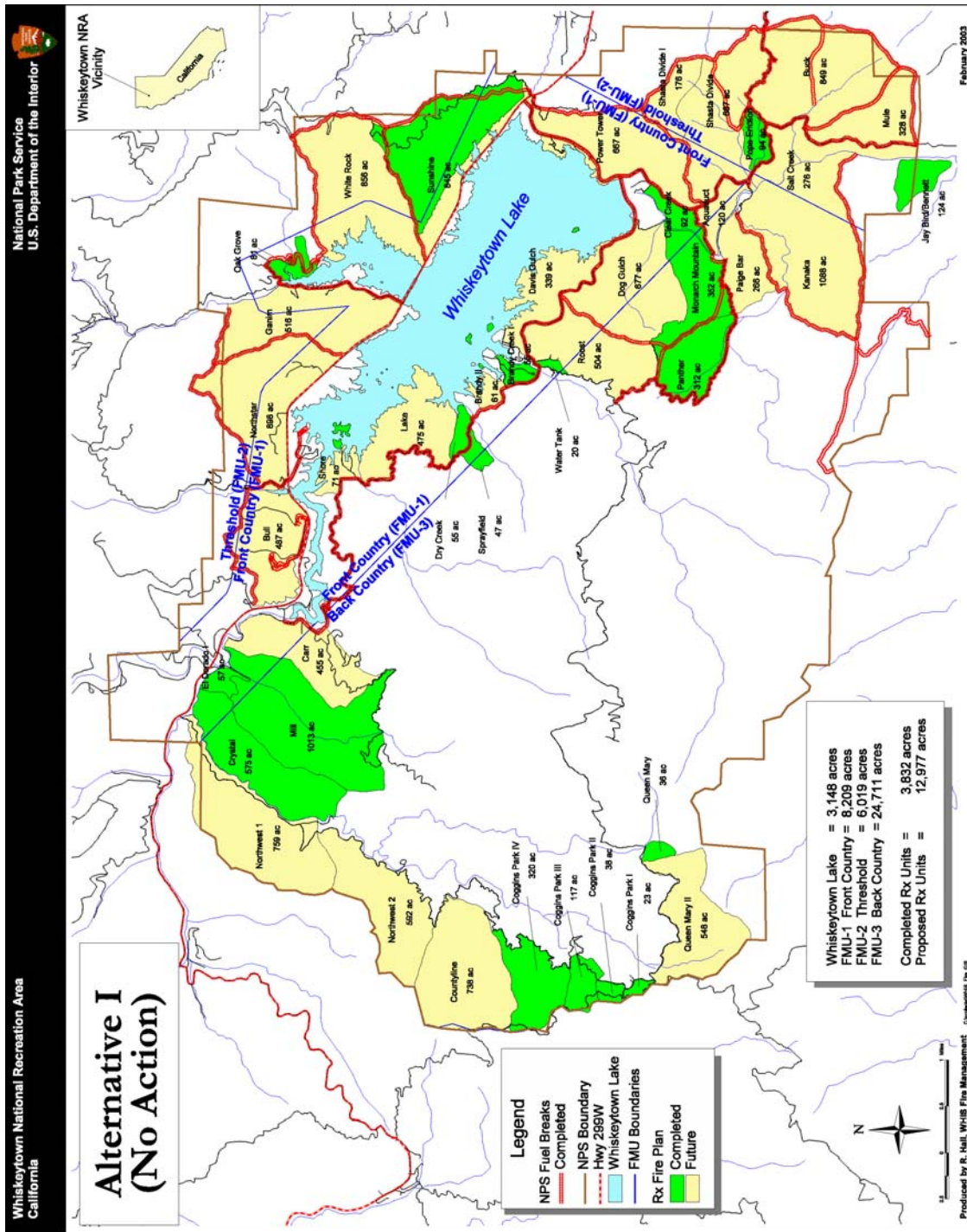
All naturally ignited fires would be suppressed in a manner consistent with firefighter safety. Wildland Fire Use would not occur in this alternative.

Mechanical treatment

Of the mechanical treatments considered, only level 1 mechanical treatment would be utilized to reduce hazardous fuel levels in the park. This would include the use of chain saws, weed- eaters, hand crews, and chippers to clear around buildings, to install and maintain shaded fuel breaks, and to clear along roadways. The existing WUI program would continue under this alternative. Total maintained shaded fuel break acres would be 850 acres, with as needed maintenance based on site evaluations occurring at least every three years. Annual average maintenance of all mechanically treated areas under this alternative would be 275 acres.

Table 2-2 Current Shaded Fuel Break System

			Purpose				
	Shaded Fuelbreak Name	Total Size (acres)	Public Safety & Evacuation	Firefighter Safety	Access for Suppression Actions	Burn Unit Boundary	Park Boundary Protection
Ridge Top	Buck	21	No	Yes	Yes	Yes	Yes
	Buck Divide	36.1	No	Yes	Yes	Yes	No
	Bull *	20.7	No	Yes	Yes	Yes	Yes
	Eiger	19.3	No	Yes	Yes	Yes	Yes
	Ganim	19.3	No	Yes	Yes	No	No
	Kanaka East	28.8	No	Yes	Yes	Yes	Yes
	Kanaka South	17.6	No	Yes	Yes	Yes	No
	Kanaka West	20.1	No	Yes	Yes	No	Yes
	Monarch	30.7	No	Yes	Yes	Yes	No
	Mule	27.3	No	Yes	Yes	No	No
	North Kanaka	33.2	No	Yes	Yes	Yes	No
	North Star East	8.5	No	Yes	Yes	Yes	Yes
	North Star West	22.6	No	Yes	Yes	Yes	Yes
	Oak Bottom	8.8	No	Yes	Yes	Yes	No
	Orofino	17.9	No	Yes	Yes	Yes	Yes
	Panther	31.6	No	Yes	Yes	Yes	No
	Prospect	13.9	No	Yes	Yes	Yes	No
	Roost	16.5	No	Yes	Yes	Yes	No
	Shasta Divide	38.9	No	Yes	Yes	Yes	Yes
	South Fork	36.3	No	Yes	Yes	Yes	No
	South Fork Spur	0.6	No	Yes	Yes	No	No
	Southwest Roost	8.1	No	Yes	Yes	Yes	No
	Sunshine	19.6	No	Yes	Yes	Yes	No
Roads	Bldgs 318-324	17.4	Yes	Yes	Yes	No	No
	Kennedy Mem Dr	38.1	Yes	Yes	Yes	Yes	No
	Muletown Road	50.1	Yes	Yes	Yes	Yes	No
	Pioneer Rd	34.6	Yes	Yes	Yes	Yes	No
	North Muletown Rd	40	Yes	Yes	Yes	Yes	No
	Paige Bar Road	66.3	Yes	Yes	Yes	Yes	No
	Post Office Road	35.1	Yes	Yes	Yes	Yes	No
	South Shore Drive	140.6	Yes	Yes	Yes	Yes	No
Total Acreage		919.6					
* Indicates shaded fuelbreak with mid-slope sections							



Map of Alternative I (No Action)

Purpose and need

Selection of Alternative I would address the purpose and need for which management action is being proposed. Firefighter and public safety would be the top priority in all management actions taken. The continuation of the current fire management program would allow the park to

improve forest health and restore a circa 1800 landscape, although this would take probably take much longer than other alternatives due to the limited number of tools available. Undesired fires would continue to be suppressed and hazardous fuels would continue to be reduced near developed areas. This alternative would continue current levels of interagency partnering to manage fire. The National Park Service would continue to develop staff expertise related to fire and fuels management. Public education would continue to be a vital component of Whiskeytown's fire management program. Charts comparing how each alternative meets the purpose and need for taking action are included at the end of this chapter.

Impact summary and impairment statement

Alternative I would continue the current fire management plan. This alternative meets several of the park's stated fire management objectives. However, it is expected that wildland fire risk would increase over time as a result of the increase in hazardous fuels. Second growth forests would continue to be overstocked, stressing overall stand health and immunity from pathogenic problems.

Fire management activities would result in some vegetation mortality, but would reduce threat of large, unmanageable and severe wildland fires. Short- term adverse impacts related to project activity would result in beneficial effects to restore more natural forest conditions. Long- term adverse impacts are acceptable due to the beneficial impacts provided, and most long- term adverse impacts could be mitigated. Prescribed fires may escape to become wildland fires. However, this risk is offset by the reduced risk of large, unmanageable, and severe wildland fires when projects are completed.

Mitigation measures may minimize adverse impact intensity and duration, however, some adverse impacts would still occur.

Fire management activities would result in some mortality, but can alter fuels in such a way that wildland fires may become more manageable. There may be additional long- term impacts to plant communities related to management actions proposed for this alternative, (particularly related to the installation and maintenance of a shaded fuel break network) that cannot be predicted at this time.

From a watershed standpoint, the treatment of fuels in the high elevation mixed conifer and ponderosa plant communities can reduce the size and intensity of wildland fires. In doing so, this lessens the chance of debris flows and other watershed events that can permanently alter riparian communities.

Among the beneficial impacts of this alternative are the ability to pre- plan for prescribed burns, mechanical treatments and shaded fuel break construction and maintenance. On the other hand, at the proposed treatment level, reduction of hazardous fuels would take several decades, increasing the possibility that high severity wildland fires could occur and result in major and permanent adverse impacts to cultural resources.

Alternative I is compatible with adjacent fire agency planning effort—the shaded fuel break system currently being implemented by Whiskeytown is a component of these plans. Any actions taken on surrounding lands would result in effects similar to fire management activities in the national park, with the same types of risks. The moderate effects of the treatments in the Whiskeytown wildland urban interface under Alternative I would potentially become beneficial, short- term and moderate.

The actions of this alternative would have adverse, short- term and minor to major effects upon the health and safety of both the public and firefighters, except during large, high severity fire events, when the proximity of people to smoke and flame would result in major, short- term, and unavoidable adverse effects.

There have been very few fire management actions taken inside the park in the past with long-term effects to either scenic or recreational resources. Fire management and fuels treatment activities likely to occur in the future under this alternative would result in impacts including introduction and spread of exotic plant species, burned areas, cut stumps, evidence of holding lines, burned area rehabilitation work, and others. Some of these effects would be potentially visible from highways passing through or roads entering the park. The effects would be adverse to beneficial, long- term and minor.

The National Park Service may not impair park resources or values. Impairment of park resources or values would not occur under Alternative I, as long as projections of acres treated, frequency of wildland fire and funding remain within the predicted range over the next ten years. In summary, Alternative I would address the fire management program goals outlined earlier, however using the very limited tools of the current program would accomplish the least of the alternatives offered in this document.

Alternative II: Prescribed Fire Dominated

This alternative emphasizes Fire Management Goal 2 – Use fire to improve wildlife habitat, stimulate biodiversity, maintain healthy watersheds, reduce exotic plants, restore circa 1800 landscapes, and improve forest health. Under Alternative II, the fire program would focus on the intentional use of fire through the application of prescribed fire to meet ecological restoration and maintenance objectives, and to reduce hazardous fuels throughout the park. All other fires would be suppressed including natural ignitions. Mechanical treatment would only be used to construct prescribed burn unit boundaries and to reduce fuels around developed areas. The shaded fuel break system would not be expanded or maintained, although existing shaded fuel breaks would be used as prescribed burn unit boundaries, as appropriate. Discussions of the general strategies are provided earlier in this chapter under the development of alternatives section. Implementation of these strategies specific to this alternative is described below.

Prescribed fire

This alternative would include pile burning and broadcast burning. Projects under Alternative II would include areas up to 1,000 acres in size to simulate, to the greatest extent feasible, the scale and pattern of natural fire events. Up to 3,000 acres would be burned during each year of implementation. Due to the limited available prescription windows during the dormant season, alternative II would implement prescribed burns during the non- dormant season from 10%- 20% of the time to maximize all available prescription windows for execution of prescribed fire projects.

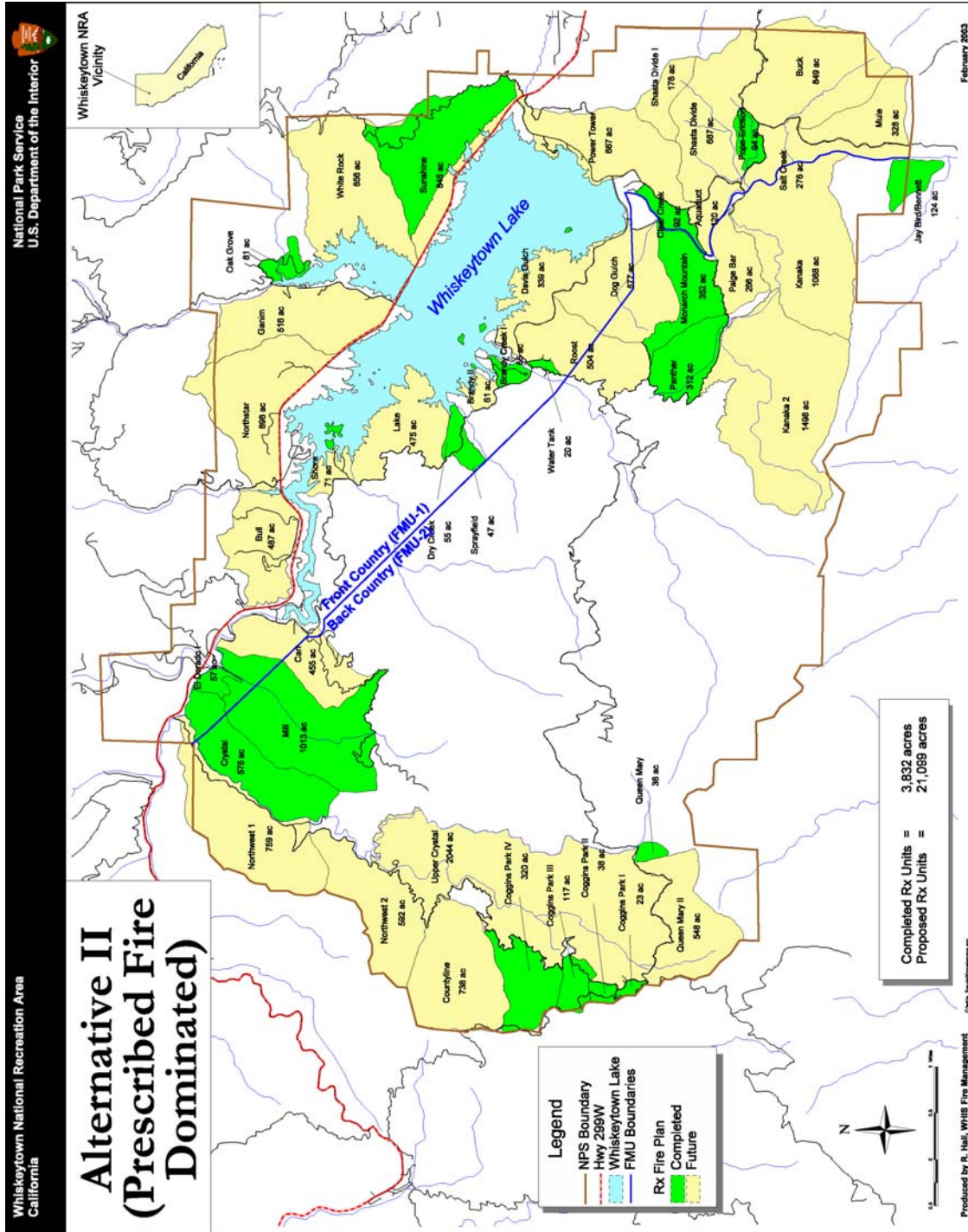
Wildland fire use

All naturally ignited fires would be suppressed in a manner consistent with firefighter safety. Wildland Fire Use would not occur in this alternative.

Mechanical treatment

Level 1 mechanical treatment would be used to accomplish hazard fuel and resource management objectives in developed areas or other improvements. It would also be used to prepare shaded fuel breaks for use as prescribed fire burn unit's boundaries. Total average mechanical treatment level 1 acres would be 80 annually.

The existing shaded fuel break system would not be maintained as it currently exists and would continue to serve as occasional prescribed fire boundaries and strategic firelines during suppression incidents. New firelines that would be installed would serve only as prescribed fire unit boundaries. The lines would be scraped down to mineral soil 2- 4 feet in width, and ladder fuels will be reduced to 20- 100 feet within the burn units. With no maintenance planned, vegetation would grow back in these areas.



Map of Alternative II (Prescribed Fire Dominated)

Purpose and need

Alternative II would meet most of the purpose and need for taking action. Public and firefighter safety would continue to top priority during all management actions. However, the increased use

of prescribed fire without the expansion and maintenance of the park's shaded fuel break system may increase the potential for fire escapes. Implementation of Alternative II would improve forest health and help restore circa 1800 landscape conditions. However, this would likely take several decades as a result of the limited number of tools available to reduce forest density and restore stand structure. Undesirable fires would continue to be suppressed, and hazardous fuels near developed areas would continue to be reduced. Interagency partnerships would be continued. Staff expertise would continue to be developed, although not in the full range of available fire and fuel management strategies due to the limited tools available under this alternative. Public education would continue to be a vital component of Whiskeytown's fire management program. Charts comparing how each alternative meets the purpose and need for taking action are included at the end of this chapter.

Impact summary and impairment statement

Alternative II would phase out the shaded fuel break system that is being developed under the current fire plan. Shaded fuel breaks would not be maintained and plant regrowth would occur. The prescribed fire program would be expanded, and necessitate spring burning to meet fuel reduction objectives. Expanded spring burning could result in increased overstory tree mortality and decreased reproduction of herbaceous species, depending on plant stage of development and timing.

This alternative meets several of the park's stated fire management objectives. Reliance on prescribed fire as the primary tool for landscape vegetation restoration would require a longer period of time than other alternatives with a broader range of fire management tools. Prescribed fires may escape to become wildland fires. However, this risk is offset by the reduced risk of large, unmanageable, and severe wildland fires.

Some vegetation and wildlife mortality would occur as prescribed fire reduces fuel levels and suppression of wildland fires continues. Mitigation measures may minimize intensity and duration of adverse impacts; however, some adverse impact would still occur.

Impairment in plant community would include type conversions and drastic and widespread changes in community structure and composition (loss of canopy cover, increased light and temperature at the surface and in water). Other impairments include widespread damage to soils (mass wasting, widespread hydrophobicity, widespread compaction, erosion).

Cultural resource management would benefit under this alternative through the ability to pre-plan for prescribed burns and mechanical treatments. On the other hand, heavy reliance on prescribed burning means that those cultural resources vulnerable to direct fire effects could be adversely impacted in situations where adequate pre-burn survey and/or mitigation could not be employed. The rate of treatment in Alternative II improves upon that proposed for Alternative I.

Alternative II conflicts with adjacent land use plans because of the elimination of the shaded fuel break system. The West Redding shaded fuel break system, developed by the local cooperating agencies, includes the lands in Whiskeytown - they are strategic areas that are essential to the effectiveness of the program. The emphasis on reducing fire risk is compatible with adjacent land plans. The implications for suppression would be mixed—a beneficial reduction in fuels is countered by reduced access for firefighters due to lack of shaded fuel break system during holding actions. Reduced holding action capacity can mean increased risk in escaped prescribed fires.

This alternative would have adverse, short-term and moderate to major effects upon the health and safety of both the public and firefighters, except during large, high severity fire events, when the

proximity of people to smoke and flame would result in major, short-term, and unavoidable adverse effects. Additionally, the absence of a shaded fuel break system in this alternative increases the intensity of direct adverse impacts to fire fighter safety. There would be no impairment from the effects of this alternative.

There have been very few fire management actions taken inside the park in the past with long-term effects to either scenic or recreational resources. Fire management and fuels treatment activities likely to occur in the future under this alternative would result in effects including burned areas, cut stumps, evidence of holding lines, burned area rehabilitation work, and others. Some of these effects would be potentially visible from highways passing through or roads entering the park. The effects would be adverse to beneficial, long-term and minor.

The National Park Service may not impair park resources or values. Impairment of park resources or values would not occur under Alternative II, as long as projections of acres treated, frequency of wildland fire and funding remain within the predicted range over the next ten years. As noted earlier, the public should be aware that this is very tenuous caveat.

In summary, Alternative II would address the fire management program goals outlined earlier, however relying on the limited tool of prescribed fire could be problematic for the fire management staff. By limiting the types of tools available for the fire program, this alternative indirectly increases involvement of outside agencies in accomplishing fire management treatment targets. Air quality concerns do prevent some prescribed fires from occurring—therefore this alternative may end up requiring a great deal of planning to occur with limited implementation ability.

Alternative III: Suppression Dominated

The development of this alternative emphasizes Fire Management Goal 3—Suppress undesirable fires in order to protect the public, property, and resources; and Fire Management Goal 4—Reduce fire risk adjacent to developed areas, urban interface boundaries, and cultural/historical sites. Under Alternative III, all natural and human-ignited wildland fires would be suppressed. No prescribed fire projects would be implemented to restore or maintain natural systems. Prescribed burning would only occur in conjunction with mechanical fuel treatments around developments and on shaded fuel breaks. Mechanical treatment level 1 and level 2 would be utilized. Fuel reduction would be the primary goal of projects implemented under this alternative. Discussions of the general strategies are provided earlier in this chapter under the development of alternatives section. Implementation of these strategies specific to this alternative is described below.

Prescribed fire

Alternative III would consist of pile burning and a few prescribed fire projects to strengthen and widen by up to ¼ to ½ mile shaded fuel breaks for tactical purposes in the case of suppression fire events. No large, broadcast burns would be conducted. Up to 250 acres would be burned during each year of implementation.

Wildland fire use

All naturally ignited fires would be suppressed in a manner consistent with firefighter safety. Wildland Fire Use would not occur in this alternative.

Mechanical treatment levels 1 and 2

This alternative would use both mechanical treatment levels 1 and 2. Mechanical treatment would be used to reduce forest fuels in and around developed areas, and to install new shaded fuel breaks, and widen existing shaded fuel breaks. Shaded fuel breaks would be used to achieve the following goals:

- Serve as strategic firelines for tactical operations during suppression incidents;
- Provide firefighter access;
- Facilitate evacuations if necessary; and,
- Facilitate prevention of fires from leaving the park or entering the park beyond the designated shaded fuel break.

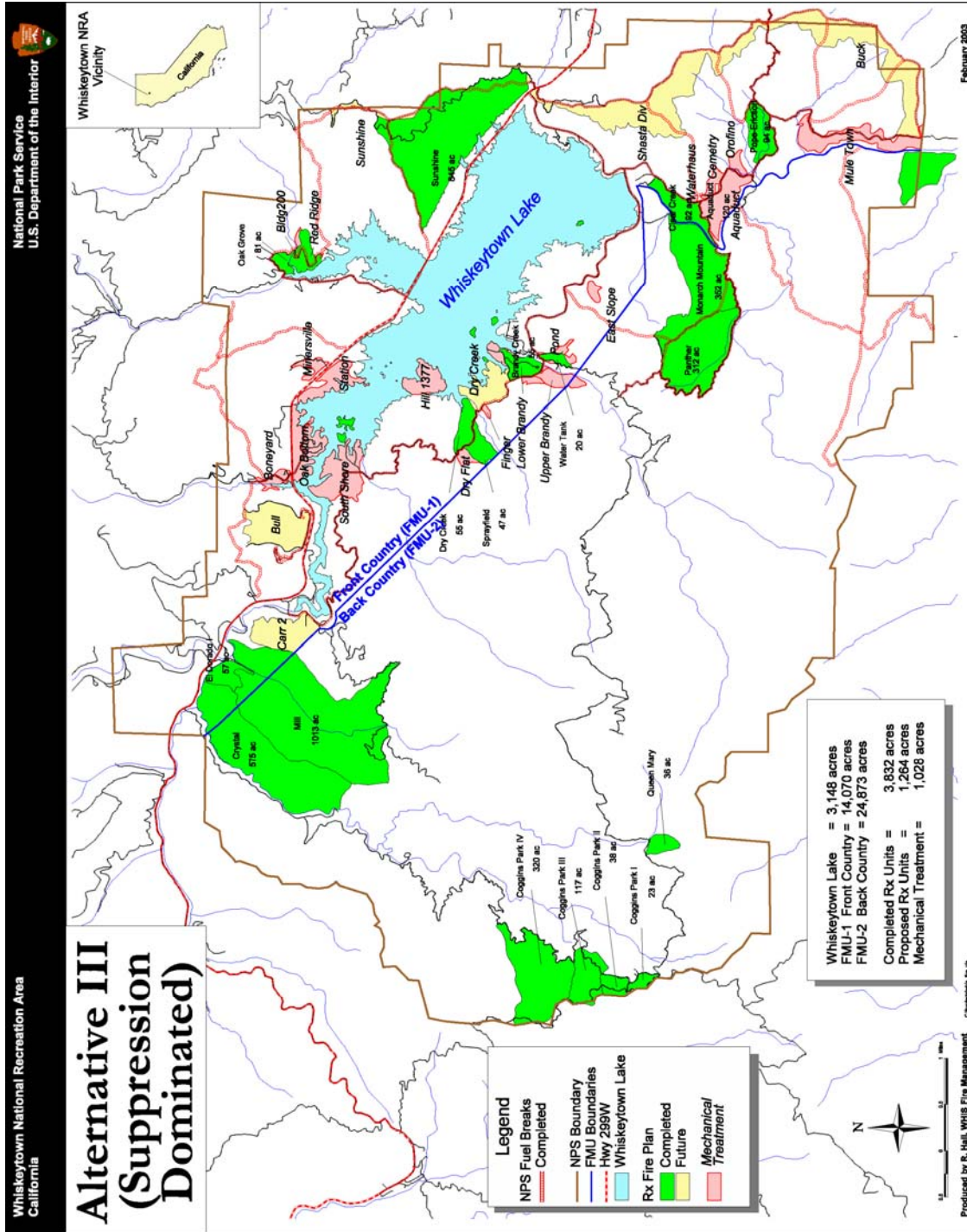
Annual program levels would be up to 225 acres for each of the two mechanical treatment levels proposed in this alternative. (See table on next page).

Table 2-3 Shaded Fuel Break System Under Alternative III (Suppression Dominated)

		Purpose					
	Shaded Fuelbreak Name	Total Size (acres)	Public Safety & Evacuation	Firefighter Safety	Access for Suppression Actions	Burn Unit Boundary	Park Boundary Protection
Ridge Top	Buck	21	No	Yes	Yes	Yes	Yes
	Buck Divide	36.1	No	Yes	Yes	No	No
	Bull*	20.7	No	Yes	Yes	Yes	Yes
	Eiger	19.3	No	Yes	Yes	No	Yes
	Ganim	19.3	No	Yes	Yes	No	No
	Kanaka East	28.8	No	Yes	Yes	No	Yes
	Kanaka South	17.6	No	Yes	Yes	No	No
	Kanaka West	20.1	No	Yes	Yes	No	Yes
	Monarch	30.7	No	Yes	Yes	No	No
	Mule	27.3	No	Yes	Yes	No	No
	North Kanaka	33.2	No	Yes	Yes	No	No
	North Star East	8.5	No	Yes	Yes	No	Yes
	North Star West	22.6	No	Yes	Yes	No	Yes
	Oak Bottom	8.8	No	Yes	Yes	No	No
	Orofino	17.9	No	Yes	Yes	No	Yes
	Panther	31.6	No	Yes	Yes	No	No
	Prospect	13.9	No	Yes	Yes	No	No
	Roost	16.5	No	Yes	Yes	No	No
	Shasta Divide	38.9	No	Yes	Yes	Yes	Yes
	South Fork	36.3	No	Yes	Yes	Yes	No
	South Fork Spur	0.6	No	Yes	Yes	No	No
	Southwest Roost	8.1	No	Yes	Yes	No	No
	Sunshine	19.6	No	Yes	Yes	No	No
Roads	Bldgs 318-324	17.4	Yes	Yes	Yes	No	No
	Kennedy Mem Dr	38.1	Yes	Yes	Yes	No	No
	Muletown Road	50.1	Yes	Yes	Yes	No	No
	Pioneer Rd	34.6	Yes	Yes	Yes	No	No
	North Muletown Rd	40	Yes	Yes	Yes	No	No
	Paige Bar Road	66.3	Yes	Yes	Yes	No	No
	Post Office Road	35.1	Yes	Yes	Yes	No	No
	South Shore Drive	140.6	Yes	Yes	Yes	No	No

Total Acreage 919.6

* Indicates shaded fuelbreak with mid-slope sections



Map of Alternative III (Suppression Dominated)

Purpose and need

Alternative III would meet most of the purpose and need for taking action. Public and firefighter safety would continue to be the top priority during management actions. However, increased

smoke production would be expected during wildland fire events as a result of surface fuel accumulation that would not be adequately reduced through mechanical treatments and limited prescribed fire. This alternative would not improve forest health or restore circa 1800 landscape conditions. Actions taken under this alternative would be designed to maximize fuel reduction and prepare for wildland fire suppression events. Fire would not be restored to the ecosystem. Undesirable fires would continue to be suppressed and hazardous fuels around developed areas would continue to be reduced. Interagency partnerships would be continued. Staff expertise would continue to be developed, although not in all available fire and fuel management strategies due to the very limited use of prescribed fire. Public education would continue to be a vital component of Whiskeytown's fire management program. Charts comparing how each alternative meets the purpose and need for taking action are included at the end of this chapter.

Impact summary and impairment statement

Alternative III would emphasize hazardous fuel reduction using primarily mechanical, as opposed to prescribed fire, treatments. This alternative meets some of the park's stated fire management objectives. However, it is expected that wildland fire frequency and intensity would increase over time. This situation could result in stand replacement, including loss of old growth, leading to type conversion.

Reliance on mechanical or repeated disturbance to some plant communities could be harmful in terms of seedling regeneration and the spread of exotic plant species. Thinning and other fire surrogate treatments can mimic the effects of fire on structural patterns of woody vegetation, but without fire, the affects on nutrient cycling, seed scarification, non-woody response, plant diversity, disease and insect infestation, and genetic diversity are unclear. More data is needed.

Fire management activities would result in some vegetation and wildlife mortality, but would eventually reduce threat of high intensity wildland fire. The risk of escaped management-ignited fire becoming wildland fire is offset by the reduced use of prescribed fire.

Mitigation measures may minimize intensity and duration of adverse impacts, however, some adverse impact would still occur.

The National Park Service may not impair park resources or values. Impairment of vegetation communities would include type conversion, loss of old-growth forest, significant changes to vegetation structure and composition (loss of canopy cover, increased light and temperature at the surface and in the water).

As it does little to reduce overall fuel loads over time, this alternative has the potential to result in major and permanent damage to cultural resources. Focusing on suppression merely delays the inevitable fact that flammable vegetation would eventually burn, likely with high intensity, and a multitude of adverse operational and indirect effects could potentially arise.

Alternative III is generally compatible with adjacent land use plans. Its emphasis on preparedness, suppression, and hazard fuel reduction is especially complimentary to the CDF state plan, and area plans. The expanded use of mechanical treatment is compatible with land use plans. Its lack of emphasis on forest health is slightly at odds with the BLM plan. A fuels buildup in the interior portions of the Recreation Area would make suppression difficult, raising fire risk. Wildland fires could grow rapidly.

This alternative would have adverse, short-term and minor to major effects upon the health and safety of both the public and firefighters, except during large, high severity fire events, when the

proximity of people to smoke and flame would result in major, short- term, and unavoidable adverse effects.

There have been very few fire management actions taken inside the park in the past with long-term effects to either scenic or recreational resources. Fire management and fuels treatment activities likely to occur in the future under this alternative would result in effects including burned areas, cut stumps, evidence of holding lines, burned area rehabilitation work, and others. Some of these effects would be potentially visible from highways passing through or roads entering the park. The effects would be adverse to beneficial, long- term and minor.

The National Park Service may not impair park resources or values. Impairment of park resources or values would not occur under Alternative III, as long as projections of acres treated, frequency of wildland fire and funding remain within the predicted range over the next ten years. As noted earlier, the public should be aware that this is very tenuous caveat.

In summary, Alternative III would address the fire management program goals outlined earlier; however the emphasis on mechanical treatment, with its associated equipment accessibility limitations in large sections of the park, would increase the risk of high frequency, high intensity wildland fires in areas most inaccessible to fire fighters.

Alternative IV: Multiple Strategy Program (Preferred Alternative)

This alternative attempts to place equal emphasis on all Fire Management Goals. Under Alternative IV, a full range of strategies would be used to achieve hazard fuel and resource management goals, including the use of prescribed fire, wildland fire use, all levels of mechanical treatment, an expanded shaded fuel break system, and fire suppression. This alternative would focus on restoring Whiskeytown's plant communities to reduce the risk of high severity wildland fire by decreasing forest stand density, reducing surface fuels, and attempting to restore fire as a natural disturbance process to the greatest extent feasible. More acres would be targeted for treatment each year than under other alternatives. Discussions of the general strategies are provided earlier in this chapter under the development of alternatives section. Implementation of these strategies specific to this alternative is described below.

Prescribed fire

This alternative would include both pile and broadcast burns. Project size for Alternative IV would range from 0.5 to 1,000 acres, and would occur in all vegetation types. Up to 2,200 acres would be treated in each year of implementation, included in which are wildland fire use acres. Slash piles would be burned or chipped after mechanical treatments. Broadcast burns would be used to reduce surface fuels and help restore fire as a natural process over larger areas. Projects located within prescribed fire burn units would occur during the non- dormant season from 0- 15% of the time. Projects located in shaded fuel breaks would occur during the non- dormant season 20- 30% of the time.

Wildland fire use

Wildland Fire Use is being considered in Alternative IV as an additional fire management tool that Whiskeytown may use to reduce the unnatural accumulation of forest fuels and to restore fire to the ecosystem. Total acres would vary considerably from year to year, but would average no more than 150/year over a several year period. Total annual acres for wildland fire use are included in the 2,200 acre total listed for prescribed fire.

Mechanical treatment levels 1, 2 and 3

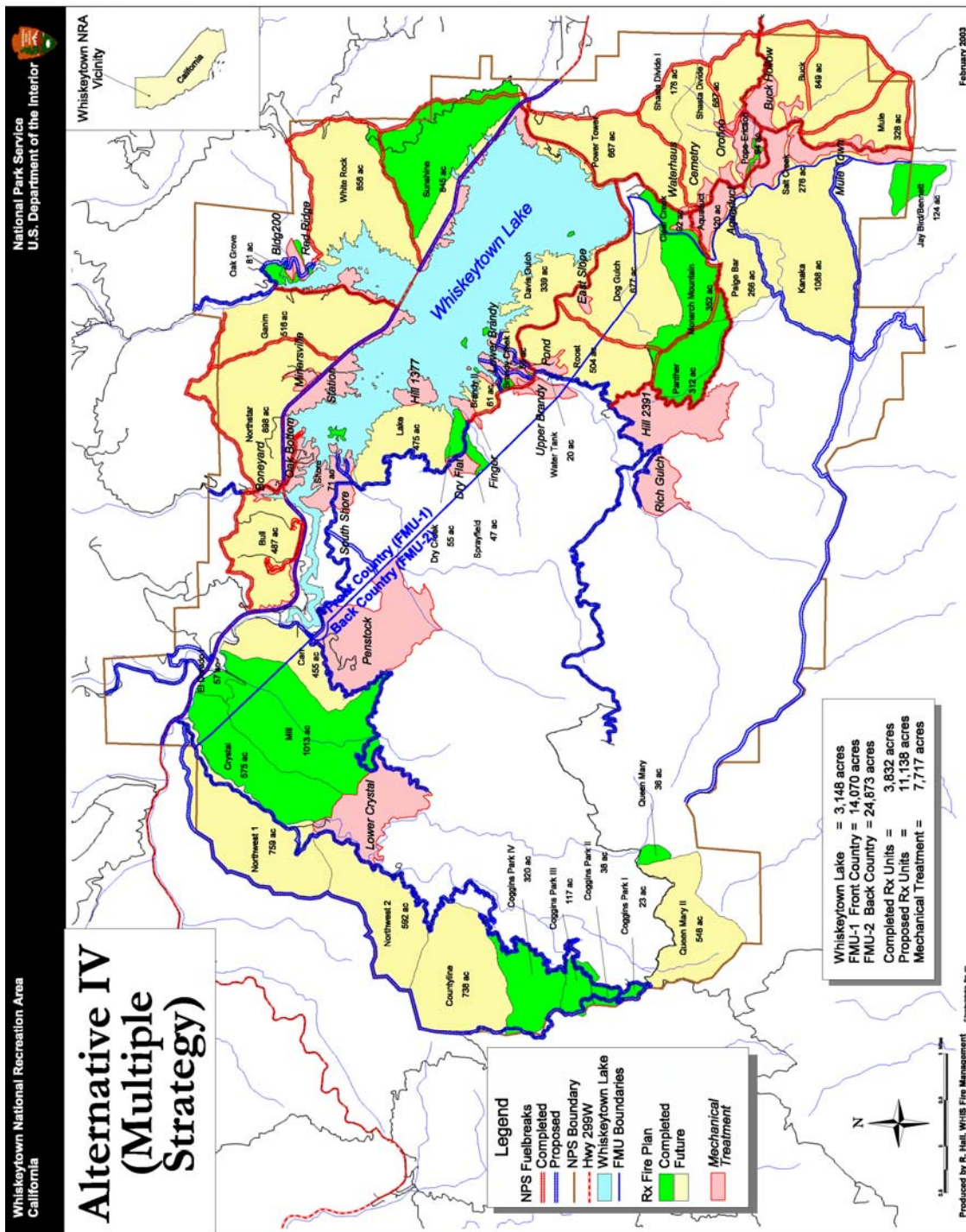
All three levels of mechanical treatment would be utilized to reduce fuel levels and mimic the effects of fire on structural patterns of woody vegetation. Mechanical treatment would be used to reduce forest fuels in and around developed areas, and to install and widen new and existing shaded fuel breaks, respectively. Shaded fuel breaks would be used as prescribed fire burn-unit boundaries, as strategic firelines for tactical operations during suppression incidents, to alter fire behavior by reducing crown fires to surface fires, to provide firefighter access, to facilitate evacuations if necessary, and to assist in preventing fires from leaving the park or entering the park beyond the designated shaded fuel break. Mechanical treatments would also focus on improving forest health by thinning dense forests and woodlands areas where fire use may be risky or otherwise inappropriate. Totals of mechanical treatment would be up to 1075 acres/year. (See table on next page).

Table 2-4 Shaded Fuel Break System under Alternative IV (Multiple Strategy)

	Shaded Fuel break Name	Total Size (acres)	Public Safety & Evacuation	Firefighter Safety	Purpose Access for Suppression Actions	Burn Unit Boundary	Park Boundary Protection
Ridge Top	Buck	21	No	Yes	Yes	Yes	Yes
	Buck Divide	36.1	No	Yes	Yes	Yes	No
	Bull *	20.7	No	Yes	Yes	Yes	Yes
	Coggins Park	5.1	No	Yes	Yes	Yes	No
	Countyline Rd	34.8	No	Yes	Yes	Yes	Yes
	Eiger	19.3	No	Yes	Yes	Yes	Yes
	Ganim	19.3	No	Yes	Yes	No	No
	Kanaka East	28.8	No	Yes	Yes	Yes	Yes
	Kanaka South	17.6	No	Yes	Yes	Yes	No
	Kanaka West	20.1	No	Yes	Yes	No	Yes
	Mill Creek	58.5	No	Yes	Yes	No	No
	Monarch	30.7	No	Yes	Yes	Yes	No
	Mule	27.3	No	Yes	Yes	No	No
	North Kanaka	33.2	No	Yes	Yes	Yes	No
	North Star East	8.5	No	Yes	Yes	Yes	Yes
	North Star West	22.6	No	Yes	Yes	Yes	Yes
	Northwest	68.5	No	Yes	Yes	Yes	No
	Oak Bottom	8.8	No	Yes	Yes	Yes	No
	Orofino	17.9	No	Yes	Yes	Yes	Yes
	Panther	31.6	No	Yes	Yes	Yes	No
	Pitmans	11.2	No	Yes	Yes	No	No
	Prospect	13.9	No	Yes	Yes	Yes	No
	Queen Mary Rd	28.6	No	Yes	Yes	Yes	No
	Roost	16.5	No	Yes	Yes	Yes	No
	Shasta Bally Rd	94.4	No	Yes	Yes	No	No
	Shasta Divide	38.9	No	Yes	Yes	Yes	Yes
	South Fork	36.3	No	Yes	Yes	Yes	No
	South Fork Spur	0.6	No	Yes	Yes	No	No
	South Shore Ridge	9.1	No	Yes	Yes	No	No
	Southern Boundary	54.3	No	Yes	Yes	No	No
	Southwest Roost	8.1	No	Yes	Yes	Yes	No
	Star Area	6.7	No	Yes	Yes	No	No
	Sunshine	19.6	No	Yes	Yes	Yes	No
	Upper Brandy	14.4	No	Yes	Yes	No	No
	Upper Crystal Crk	85.4	No	Yes	Yes	Yes	No
Roads	Bldgs 318-324	17.4	Yes	Yes	Yes	No	No
	Grizzley Gulch Rd	25.6	Yes	Yes	Yes	Yes	No
	Hwy 299-1	65	Yes	Yes	Yes	Yes	No
	Hwy 299-2	60.8	Yes	Yes	Yes	Yes	No
	Hwy 299-3	86.1	Yes	Yes	Yes	Yes	No
	Kennedy Mem Dr	38.1	Yes	Yes	Yes	Yes	No
	Lower Crystal Crk	95.6	Yes	Yes	Yes	No	No
	Muletown Road	50.1	Yes	Yes	Yes	Yes	No
	North Muletown Rd	40	Yes	Yes	Yes	Yes	No
	Paige Bar Road	66.3	Yes	Yes	Yes	Yes	No
	Pioneer Rd	34.6	Yes	Yes	Yes	Yes	No
	Post Office Road	35.1	Yes	Yes	Yes	Yes	No
	South Shore Drive	140.6	Yes	Yes	Yes	Yes	No
	Trinity Mnt Road	39.9	Yes	Yes	Yes	No	No
	Whiskey Creek Rd	27.3	Yes	Yes	Yes	Yes	No

Total Acreage 1790.9

* Indicates shaded fuelbreak with mid-slope components



Map of Alternative IV (Multiple Strategy)

Purpose and need

Selection of Alternative IV would address the purpose and need for taking action. Firefighter and public safety would be the top priority during all management actions. The expansion of the current fire management program would allow the park to more effectively improve forest health and restore a circa 1800 landscape through the use of all available fire and fuel management tools,

including the use of prescribed fire, mechanical treatment and the use of managed wildland fire. Undesired fires would continue to be suppressed and hazardous fuels would continue to be reduced near developed areas. This alternative would enhance current levels of interagency partnering to manage fire. The National Park Service would continue to develop staff expertise related to fire and fuels management. Public education would continue to be a vital component of Whiskeytown's fire management program. Charts comparing how each alternative meets the purpose and need for taking action are included at the end of this chapter.

Impact summary and impairment statement

Alternative IV would utilize all available fire management and fuel reduction techniques to reduce the risk of high severity wildland fire while managing prescribed fire and some natural ignitions to meet resource management objectives. Despite a broader range of fire management tools, it is expected that wildland fire frequency and intensity would increase over the short-term, until such time as the actions implemented on the ground begin to promote a return of the fire return interval and naturally occurring fire intensity. This alternative meets all of the park's stated fire management objectives. It is expected that wildland fires would be reduced over time using a combination of fire management techniques in comparison to the current fire management program.

Fire management activities would result in some vegetation mortality, but would reduce threat of high severity wildland fire. Prescribed fires may escape to become wildland fires. However, this risk is offset by the reduced risk of wildland fire ignition and high severity wildland fires when projects are completed.

Mitigation measures may minimize intensity and duration of adverse impacts; however some adverse impact would still occur.

Impairment of would include vegetation community type conversion as well as widespread soil damage (mass wasting and hydrophobicity).

Under this alternative, a substantial number of projects would be subjected to pre-planning for cultural resources compliance and a mix of prescribed fire and mechanical treatments would be employed. Wildland fire use would be allowed, and could potentially result in adverse impacts to cultural resources, although these would encompass a relatively small acreage in any given year. As the most aggressive alternative at combating hazardous fuel loads, Alternative IV would more quickly reduce the chances of adverse effects associated with wildland fires and wildland fire suppression than other alternatives.

Alternative IV is generally compatible with adjacent land use plans. The increased emphasis on the shaded fuel break system, and mechanical treatments for fuels is emphasized on neighboring lands. The additional emphasis on mechanical treatments, including the use of mechanized equipment to reduce brush and thin trees, is compatible with adjacent land use plans, which currently call for mechanized equipment to reduce hazard fuels and restore landscapes.

A potential conflict is the added strategy of wildland fire use. This strategy is not utilized by the California Department of Forestry and Fire Protection (CDF) on their direct protection lands, and would be a new strategy for the area. The potential conflicts can be mitigated by careful application of this strategy, close cooperation between CDF and National Park Service, and a clear understanding of the parameters of the use of this strategy.

This alternative would have adverse, short- term and minor to major effects upon the health and safety of both the public and firefighters, except during large, high severity fire events, when the proximity of people to smoke and flame would result in major, short- term, and unavoidable adverse effects. There would be no impairment from the effects of this alternative.

There have been very few fire management actions taken inside the park in the past with long-term effects to either scenic or recreational resources. Fire management and fuels treatment activities likely to occur in the future under this alternative would result in effects including burned areas, cut stumps, evidence of holding lines, burned area rehabilitation work, and others. Some of these effects of this alternative would be potentially visible from highways passing through or roads entering the park. The effects would be adverse to beneficial, long- term and range from negligible to minor.

The National Park Service may not impair park resources or values. Impairment of park resources or values would not occur under Alternative IV, as long as projections of acres treated, frequency of wildland fire and funding remain within the predicted range over the next ten years. As indicated previously, the public should be aware that this is very tenuous caveat.

In summary, Alternative IV would address the fire management program goals outlined earlier, using the broadest set of fire management tools available to potentially accomplish more than any of the other alternatives offered in this document.

The environmentally preferred alternative

National Park Service policy regarding implementation of the National Environmental Policy Act (NEPA) requires that an environmentally preferred alternative be identified in all NEPA analysis documents. Determination of this alternative takes place after the environmental analysis is complete. The environmentally preferred alternative is the alternative that promotes the national environmental policy expressed in Section 101 of NEPA. This includes alternatives that would:

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- Assure for all for all visitors a safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
- Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- Preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment which supports diversity and variety of individual choice;
- Achieve a balance of population and resource use which would permit high standards of living and a wide sharing of life's amenities; and
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Simply put, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural and natural resources.

After analyzing the alternatives described in this Draft Environmental Impact Statement, the National Park Service has determined that Alternative IV is environmentally preferred.

National Park Service policy also directs that all environmental analysis documents address compliance with Section 102(1) of NEPA. This section states that the policies, regulations, and

public laws of the United States shall be interpreted and administered in accordance with the policies set forward in NEPA. This document was written in support of National Park Service Fire Policy and other policies and legislation governing management of National Park sites in accordance with NEPA.

Range of Alternatives

The alternatives described in this chapter represent a range of reasonable alternatives. A reasonable alternative is one that achieves, in large part; the agency defined purpose and need while not violating any minimum environmental standards. The purpose and need for writing a fire management plan are described in Chapter 1. Fire management and natural resource management staff at Whiskeytown National Recreation Area identified seven program goals that address the park's purpose and need for taking action. Six alternatives were developed using these criteria.

- Alternative I – No Action (Current Program)
- Alternative II – Prescribed Fire Emphasis
- Alternative III – Suppression Emphasis
- Alternative IV – Multiple Strategy Program
- Alternative V – Mechanical Emphasis
- Alternative VI – Natural Fire Emphasis

Each alternative was crafted in a manner that would address most if not all of the goals and objectives. These points are summarized in the tables below.

Alternatives eliminated from further study

A preliminary analysis of alternatives resulted in the elimination of Alternative 5 – Mechanical Fuel Reduction Dominated, and Alternative 6 – Natural Fire Dominated. These alternatives are described below.

Alternative V - Mechanical Fuel Reduction Dominated

This alternative would maximize the use of mechanical treatments to meet fire and fuel management goals. Prescribed burns would be used to eliminate slash generated through mechanical treatments, but not to treat fuels or restore fire as a natural disturbance process. This alternative would use all levels of mechanical treatment, ranging from use of hand tools to small-scale logging in order to construct and maintain shaded fuel breaks along park boundaries and developed areas within the park. Areas where mechanical treatment can be employed to reduce fuels at a larger scale at Whiskeytown are limited because much of the park is too steep, inaccessible, or has highly erosive soils to apply mechanical treatments to any great degree.

This alternative was eliminated from further consideration because it does not adequately meet the stated purpose and need for taking action that is described in Chapter 1. Public and firefighter safety would be at increased risk if this alternative were chosen because no pro-active fuels reduction would only occur in areas limited appropriate areas. In addition to this, continuation of a full suppression program at Whiskeytown would increase the risk for high severity wildland fire due to the continued accumulation of forest fuels. This alternative would only foster interagency partnerships related to wildland fire suppression, and staff expertise would only be developed related to fire suppression activities and various mechanical treatments.

Alternative V would meet some of the stated purpose and need in that it would continue to suppress undesirable fires and reduce hazard fuels near developed areas. Whiskeytown would

also continue to educate the public on the park's fire management program. The safety risk and risk to park resources were deemed unacceptable. Additionally, this alternative would not meet the requirements outlined in the new National Fire Plan. Alternative 5 was not retained for further analysis for the reasons mentioned above.

Alternative VI – Natural Fire Dominated Program

This alternative would minimize management actions by allowing managed natural ignitions (lightning caused wildland fires) to accomplish hazard fuel reduction and resource management goals. All human- ignited fires would be suppressed, as would any naturally ignited fires that posed an unacceptable risk to human safety, park resources, or park neighbors. Fire would also be suppressed if resources (staff and equipment) to manage the long- term fire events were unavailable.

A very limited amount of prescribed burning would occur to facilitate the use of natural ignitions. This would involve improving control lines to contain naturally ignited fires within pre-determined boundaries. Level I mechanical fuel treatment would be used to reduce fuel levels in and around developed areas and along park boundaries to buffer these sites from unplanned events. The shaded fuel break system would not be expanded or maintained under this alternative.

This alternative was eliminated from further consideration because it does not adequately meet the stated purpose and need for taking action that is described in Chapter 1. Public and firefighter safety would be at increased risk if this alternative were chosen because no pro- active fuels reduction would occur. This would increase the risk for high severity wildland fire due to the continued accumulation of forest fuels. This alternative would only foster interagency partnerships related to wildland fire use and wildland fire suppression. Staff expertise would only be developed related to these limited actions.

Alternative VI would meet some of the stated purpose and need in that it would continue to suppress undesirable fires and reduce hazard fuels near developed areas. Whiskeytown would also continue to educate the public on the park's fire management program. However, the primary goal of promoting public and firefighter safety would not be met because wildland fire events that occurred would be more likely to result in high intensity crown fires that would significantly impact park resources. In this alternative the goal of improving forest health to restore circa 1800 landscape conditions would be unlikely to occur. The safety risk and risk to park resources were deemed environmentally unacceptable. Additionally, this alternative would not meet the requirements outlined in the new National Fire Plan. Alternative 6 was not retained for further analysis for the reasons mentioned above.

Table 2-5 Range of alternatives compared by fire management goals

Goals	Alt. I	Alt. II	Alt. III	Alt. IV	Alt. V	Alt. VI
Firefighter & Public Safety	●	●	●	●	○	○
Restore landscape and forest health	●	●	○	●	○	○
Suppress undesired fires	●	●	●	●	●	●
Reduce hazardous fuels near developed areas	●	●	●	●	●	●
Foster interagency relationships	●	●	●	●	○	○
Develop staff expertise	●	●	●	●	○	○
Educate public on fire	●	●	●	●	●	●

● - A component of the alternative
○ - Not a component of the alternative

Table 2-6 Scope of individual projects and annual program

Strategies		Alt. I	Alt. II	Alt. III	Alt. IV
Mechanical treatments	Project size	Up to 25 acres	Up to 100 acres	Up to 200 acres	Up to 300 acres
	Projects/year	Up to 16	Up to 6	Up to 12	Up to 20
	Annual Average	225 acres/year	80 acres/year	450 acres/year	1075 acres/year
Prescribed fire	Project size	1000 acres max	1000 acres max	30 acres max	1000 acres max
	Projects/year	Up to 6	Up to 10	Up to 7	Up to 10
	Annual Average	1400 acre/year	3000 acre/year	250 acre/year	2200 acre/year
Wildland fire use	Project size	None	None	None	Up to 1000 acres
	Projects/year	None	None	None	0-5
	Annual Average	None	None	None	150 acres ^a

*The acreage and project numbers are not program targets, but rather are shown to demonstrate the anticipated differences between alternatives based on the fire management tools available to each.

Table 2-7 Range of alternatives compared by fire management strategy

Strategy	Alt. I	Alt. II	Alt. III	Alt. IV	Alt. V	Alt. VI
Suppression	●	●	●	●	●	●
Prescribed Fire	●	●	●	●	○	●
Mechanical 1	●	●	●	●	●	●
Mechanical 2	○	○	●	●	●	○
Mechanical 3	○	○	○	●	●	○
Shaded fuel break	●	○	●	●	●	○
Wildland Fire Use	○	○	○	●	○	●

● - A component of the alternative

○ - Not a component of the alternative

Table 2-8 Range of alternatives compared by Shaded Fuel Break System utilization

	Shaded Fuelbreak Name	Public Safety & Evacuation			Firefighter Safety			Access for Suppression Actions			Burn Unit Boundary			Park Boundary Protection		
		Alt. I	Alt. III	Alt. IV	Alt. I	Alt. III	Alt. IV	Alt. I	Alt. III	Alt. IV	Alt. I	Alt. III	Alt. IV	Alt. I	Alt. III	Alt. IV
Ridge Tops	Buck	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Buck Divide	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
	Bull	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Eiger	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
	Ganim	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
	Kanaka East	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
	Kanaka South	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
	Kanaka West	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
	Monarch	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
	Mule	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
	North Kanaka	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
	North Star East	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
	North Star West	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
	Oak Bottom	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
	Orofino	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
	Panther	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
	Prospect	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
	Roost	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
	Shasta Divide	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	South Fork	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
	South Fork Spur	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
	Southwest Roost	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
	Sunshine	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No

Table 2-9 Range of alternatives compared by Shaded Fuel Break System utilization (continued)

	Shaded Fuelbreak Name	Public Safety & Evacuation			Firefighter Safety			Access for Suppression Actions			Burn Unit Boundary			Park Boundary Protection		
		Alt. I	Alt. III	Alt. IV	Alt. I	Alt. III	Alt. IV	Alt. I	Alt. III	Alt. IV	Alt. I	Alt. III	Alt. IV	Alt. I	Alt. III	Alt. IV
	Bldgs 318-324	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
	Kennedy Mem Dr	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
	Muletown Road	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
	North Muletown Rd	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
	Paige Bar Road	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
	Pioneer Rd	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
	Post Office Road	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
	South Shore Drive	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
	<i>Implemented under Alternative IV Only</i>															
Roads	Grizzley Gulch Rd			Yes			Yes			Yes			Yes			No
	South Shore Ridge			No			Yes			Yes			No			No
	Southern Boundary			No			Yes			Yes			No			No
	Star Area			No			Yes			Yes			No			No
	Trinity Mnt Road			Yes			Yes			Yes			No			No
	Upper Brandy			No			Yes			Yes			No			No
	Upper Crystal Crk			No			Yes			Yes			Yes			No
	Whiskey Creek Rd			Yes			Yes			Yes			Yes			No
	Coggins Park			No			Yes			Yes			Yes			No
	Countyline Rd			No			Yes			Yes			Yes			Yes
	Hwy 299-1			Yes			Yes			Yes			Yes			No
	Hwy 299-2			Yes			Yes			Yes			Yes			No
	Hwy 299-3			Yes			Yes			Yes			Yes			No
	Lower Crystal Crk			Yes			Yes			Yes			No			No
	Mill Creek			No			Yes			Yes			No			No
	Northwest			No			Yes			Yes			Yes			No
	Pitmans			No			Yes			Yes			No			No
	Queen Mary Rd			No			Yes			Yes			Yes			No
	Shasta Bally Rd			No			Yes			Yes			No			No

Table 2-10 Impacts Summary

Affected Environment	Alternative I No Action	Alternative II Prescribed Fire Dominated	Alternative III Suppression Dominated	Alternative IV Multiple Strategy Program
Biological Environment				
Vegetation	Adverse to beneficial, negligible to major, short to long term, more data needed	Adverse to beneficial, negligible to major, short to long term, more data needed	Adverse to beneficial, negligible to major, short to long term, more data needed	Adverse to beneficial, negligible to major, short to long term, more data needed
Wildlife and Fish	Moderate to major, adverse, long term, more data needed	Minor short term adverse to moderate long term beneficial, more data needed	Moderate to major, adverse, long term, more data needed	Minor short term adverse to moderate long term beneficial, more data needed
Special Status Species	Moderate to major, adverse, long term, more data needed	Minor short term adverse to moderate long term beneficial, more data needed	Moderate to major, adverse, long term, more data needed	Minor short term adverse to moderate long term beneficial, more data needed
Geophysical Environment				
Soils	Beneficial, major, long term	Beneficial, major, long term	Beneficial, major, long term	Beneficial, major, long term
Water Quality	Beneficial, major, long term	Beneficial, major, long term	Beneficial, major, long term	Beneficial, major, long term
Air Quality	Adverse, negligible to major, short to long-term	Adverse, negligible to major, short to long-term	Adverse, negligible to major, short to long-term	Adverse, negligible to major, short to long-term
Ecologically Critical Area	More data is needed, moderate to major, adverse, long term	More data is needed, minor short term adverse to moderate long term beneficial	More data is needed, moderate to major, adverse, long term	More data is needed, minor short term adverse to moderate long term beneficial
Cultural Environment and Special Designations				
Archaeological properties, historical structures, ethnographic resources, cultural landscapes, museum collections	Long term moderate beneficial to short term major adverse	Long term moderate beneficial to short term major adverse to beneficial	Long term major adverse	Long term moderate beneficial to short term major adverse
Social Environment				
Health and Safety	Adverse, negligible to major, short to long term	Adverse, negligible to major, short to long term	Adverse, negligible to major, short to long term	Adverse, negligible to major, short to long term
Community Economics	Beneficial, minor to moderate, short to long-term	Beneficial, minor to moderate, short to long-term	Beneficial, minor to moderate, short to long-term	Beneficial, minor to moderate, short to long-term
Visual Resources	Beneficial, minor, long term	Beneficial, moderate, long term	Beneficial, moderate, long term	Beneficial, moderate, long term
Recreation	Adverse to beneficial, minor, long term	Adverse to beneficial, minor, long term	Adverse to beneficial, minor, long term	Adverse to beneficial, minor, long term
Compatibility with Land Use Plans	compatible	Moderate ,adverse, short term to Moderate beneficial, long term	Adverse to beneficial, negligible, long term	Moderate ,adverse , short term to major, beneficial, long term